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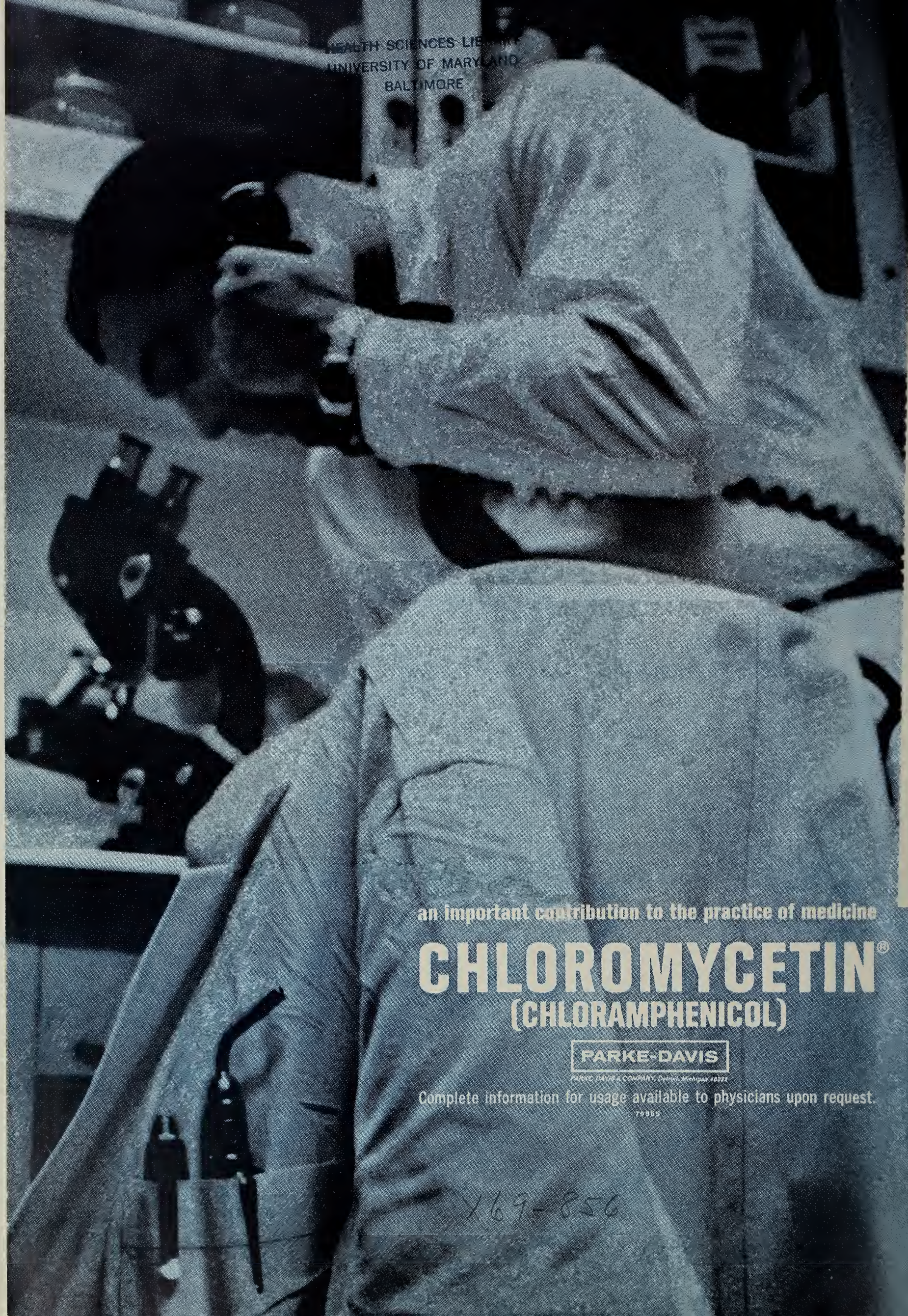
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CONTENTS

Phenylketonuria 13
Stanley H. Nordmo, M.D., Vermillion, S. Dak.

The Future Supply of Physicians with
Special Reference to South Dakota 18
George W. Knabe, Jr., M.D., Vermillion, S. Dak.

Minutes of the Executive Committee 21

PathCAPsule — "The Carcinoid Syndrome" 22

President's Page 23
Paul Hohm, M.D., Huron, S. Dak.

Cystosarcoma Phyllodes: A Review of Three Cases 26
G. Robert Bartron, M.D., Watertown, S. Dak. and
Richard J. Weaver, M.D., Sioux Falls, S. Dak.

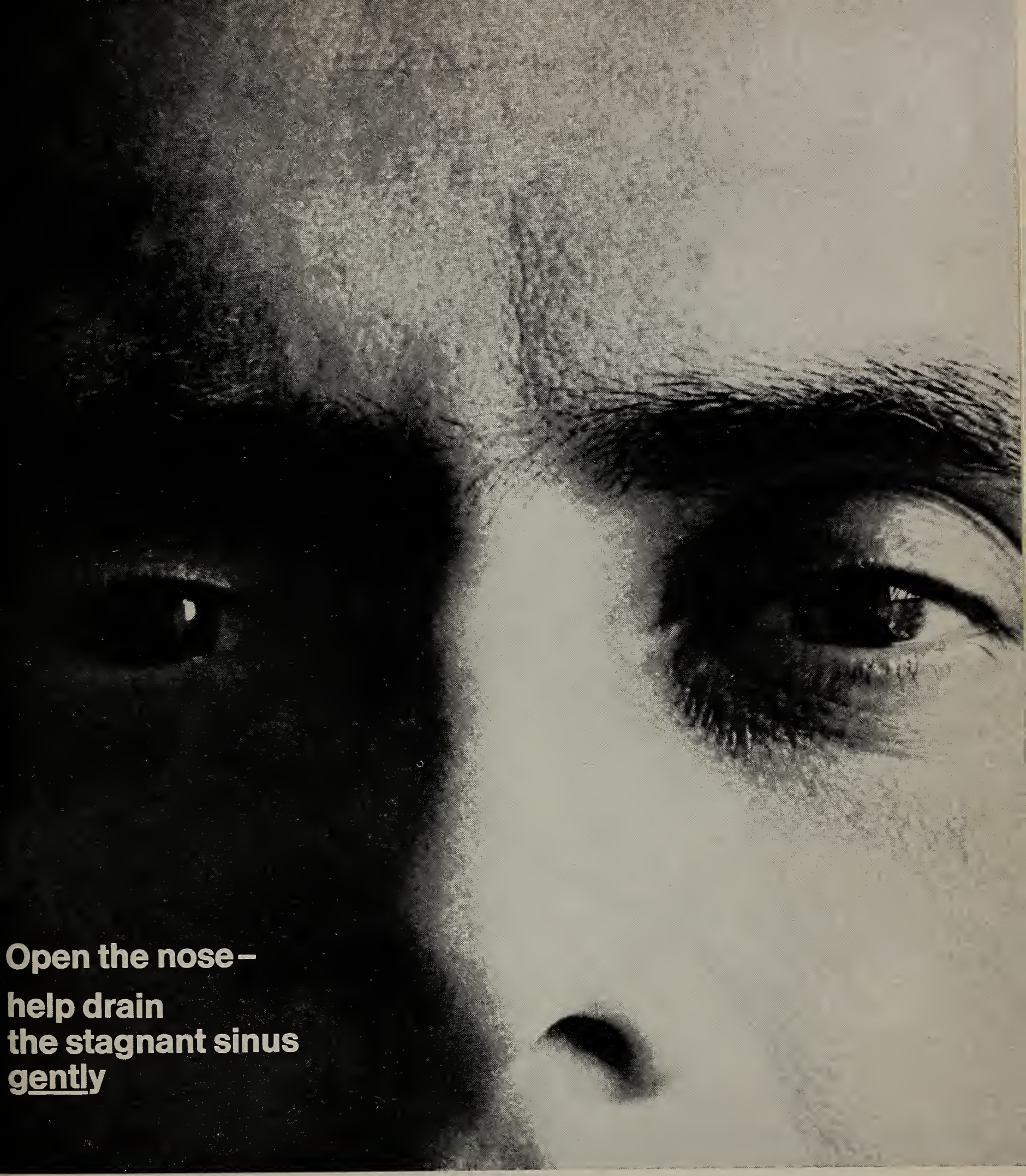
William Osler Medal — Student Essay Contest 29

Editorial Page 31

This Is Your Medical Association 33

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PHENYLKETONURIA

by

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First described in 1934, phenylketonuria is an inborn error of phenylalanine metabolism. Transmission is through an autosomal recessive gene, which is believed to be present in about one in seventy persons.[1]

In normal individuals, the essential amino acid phenylalanine is transformed to tyrosine in the liver by phenylalanine hydroxylase. In persons with phenylketonuria, activity of this liver enzyme fails to develop.[2] As a result, increased amounts of phenylalanine persist in the tissues, leading to the formation of an excess of metabolites. By the time phenylalanine reaches a blood level of 12 - 15 mgm%, phenylpyruvic acid is excreted in the urine. Other urinary metabolites include phenyllactic acid, o-hydroxyphenylacetic acid and phenylacetic acid.[3]

Early Clinical Manifestations

In the untreated patient, mental retardation is the most constant finding. Clinical clues identified by Partington[4] as usually occurring within the first year of life are infantile eczema, musty urine odor, irritability, vomiting in the early weeks, and seizures. If these appear in a blond child, the diagnosis should be strongly suspected.

Incidence

The incidence in past reports has varied from 1:20,000[5] to 1:40,000.[6] A study based on 864,599 urine tests revealed an approximate incidence of 1:22,000 in Great Britain.[7] On the basis of 404,568 serum phenylalanine tests performed during a nationwide screening program, the incidence of phenylketonuria in the United States is about 1:10,000.[8]

In South Dakota, where the annual number of live births is about 18,000, there should probably be two new cases of phenylketonuria a year. Since there is no state registry for phenylketonuria, the actual annual incidence is unknown. At the present time, there are 14 phenylketonuric patients at the Redfield State Hospital and School.

Reasons for Testing for Phenylketonuria

The foremost reason for newborn screening programs is that the degree of mental impairment can be modified effectively by dietary treatment. One report[9] notes that children whose treatment is initiated before the age of six months will probably fall into the borderline to normal range of intelligence (I.Q. 70 to more than 100). Children whose treatment is begun between seven and eighteen months of age may achieve the level of the educable mentally handicapped (I.Q. 50 - 70), whereas if treatment is delayed beyond the second birthday, the children may not even reach the trainable threshold (I.Q. 30).

A potential by-product of newborn screening programs is the recognition of carriers and undiagnosed cases. In one example, Coffelt[10] described an infant who had high levels of serum phenylalanine for six weeks, but had a normal level at seven weeks. The mother showed an increased concentration of phenylalanine in her serum, but no evidence of mental retardation. Her first-born child with an I.Q. of 48 and high levels of serum phenylalanine was only diagnosed as being phenylketonuric after the temporary elevation of serum phenylalanine in her second child, had prompted further study of the family.

Routine prenatal testing for phenylketonuria may also be justifiable. Mothers with phenylketonuria have given birth to children with mental retardation but without phenylketonuria.[11] Elevated levels of serum phenylalanine during pregnancy may result in permanent damage to the fetal brain. If such dam-

age can be avoided through restriction of phenylalanine intake, then prenatal screening for phenylketonuria, according to one viewpoint,[12] is justified.

If mental retardation in phenylketonuria is to be averted, then all newborn infants, mothers and siblings of any newborn infants with increased serum phenylalanine levels, and possibly all women during pregnancy should be screened.

The second reason is economic. The untreated phenylketonuric patient, in almost all instances, requires intensive custodial care. The cost of life-long institutional care for one patient has been estimated to run from $100,000 to $200,000.[13] Foster[14] has calculated that detection programs cost about $25,000 per case. In Massachusetts in the course of one year, 80,494 Guthrie screening tests were run, and ten phenylketonuric babies were discovered, for a total cited cost of $30,000, and a cost per new case of $3,000.[15]

The prospects of preventing mental retardation and of saving tax money on long term institutional care, have stimulated the passage of laws requiring testing for phenylketonuria in twenty states. The legislatures in five additional states have declared testing for phenylketonuria to be in the public interest. During the recent session of Congress, Senators Winston L. Prouty (R-Vt.) and Edward M. Kennedy (D-Mass.) introduced a bill to ensure testing for phenylketonuria and other inborn errors of metabolism under Federal law.

Laboratory Methods of Detection and Diagnosis

Ideally, a blood phenylalanine test should be done before the infant is discharged from the hospital, and after the infant has been on a milk feeding schedule for at least 24 hours.[16] The two blood tests in general use at this time are the semi-quantitative bacterial inhibition assay method of Guthrie,[17] and the more precise fluorimetric method of McCaman and Robins.[18]

The fluorimetric method, which is available in several clinical laboratories in South Dakota, is the procedure of choice. This technic is based on the observation that the fluorescence developing from the reaction of phenylalanine and ninhydrin is greatly enhanced in the presence of L-leucyl-L-alanine. The result is read in a fluorimeter. Hsia et al.[19] demonstrated that a micromethod modification was suitable for screening infants. Irwin et al.,[20] by running both the fluorimetric and the bacterial inhibition assay tests in parallel on newborn infants, showed that the fluorimetric procedure was accurate and more sensitive than the bacterial inhibition assay method. In their study, normal phenylalanine blood levels for infants routinely discharged on the second to third day of life, were less than 3 mgm%.

In the Guthrie test, a specially prepared bacterial culture medium is inoculated with spores of Bacillus subtilis, and beta-2-thienylalanine, an inhibitor of the growth of this organism, is added. This will not prevent growth, however, in the presence of phenylalanine. Small filter paper discs, impregnated with blood obtained by heel puncture, are placed on the surface of the culture medium, along with control discs containing, 2, 4, 6, 8, 10, 12 and 20 mgm% respectively of phenylalanine. After overnight incubation, zones of growth surrounding the discs are observed and compared to zones around the control discs. A zone of growth matching that around the 4 mgm% control disc is interpreted as a presumptive positive, and requires confirmation by one of the quantitative tests. The widely available Guthrie test is best done after the third day of life, when serum phenylalanine concentrations of 4 mgm% or greater are most likely to occur.

Bixby et al.,[21] and Partington and Sinnott[22] have strongly endorsed the Guthrie test as being sensitive, reliable and both sufficiently simple and economically practical for screening large populations for phenylketonuria. However, the test is still a semi-quantitative one and does not take the place of the more definitive procedures. False positive results occur about once in every 1500 tests.

Other tests are available, including chromatographic and enzymatic procedures. Of these, the La Du test[23] is a quantitative method involving the oxidation of L-phenylalanine in the blood sample to phenylpyruvic acid through the use of L-amino acid oxidase. The phenylpyruvic acid is converted to an enol-borate complex which is measurable spectrophotometrically. The test has been modified for micromethod techniques.[24]

The final diagnosis of phenylketonuria is unquestioned if the serum phenylalanine level remains above 15 mgm% on repeated quantitative determinations. In an infant with readings below this, Guthrie[8] suggests that the diagnosis

can be established by determining that both parents are heterozygotes, and by testing the infant with a regular milk diet for 48 hours, after a low phenylalanine diet has been in effect for one to two months. If both parents are carriers, and if the infant responds with a significant rise in phenylalanine, then the diagnosis is confirmed.

Tests for Phenylpyruvic Acid in the Urine

Phenylpyruvic acid appears in the urine by the time a phenylketonuric infant reaches the age of two to six weeks. Qualitative urine tests are thus best employed at the time of the first office visit. If positive, they must be confirmed by tests for serum phenylalanine. Normally, there is no urinary phenylpyruvic acid in infants, and only trace amounts in adults.

Allen and Wilson[25] have emphasized recently that the presence of phenylpyruvic acid in the urine is a major feature of phenylketonuria. Some normal infants, premature infants as a group and infants who are heterozygous carriers of the recessive gene may have elevated levels of serum phenylalanine; but these infants do not produce the urinary metabolites associated with phenylketonuria. An increase of phenylalanine in the serum and of phenylpyruvic acid in the urine are both necessary for the diagnosis.

The three most commonly used qualitative urine tests are the ferric chloride test,[26] the Phenistix ® paper dip-stick test[27, 28] and the 2, 4-dinitrophenylhydrazine test.[26]

Of the various ferric chloride tests in use, the simplest procedure is to place a few drops of 10% ferric chloride on a wet diaper. An immediate, medium dark, blue-green color appears if the test is positive. The color fades away within two to three minutes. This fleeting color response helps to rule out false positive results, since other substances reacting with ferric chloride tend to produce stable color responses. In the absence of bacterial contamination, the ferric chloride test is capable of detecting a concentration of phenylpyruvic acid as small as 2 mgm%.[25]

The Phenistix ® dip and read test consists of a filter paper strip which has been treated with a buffered ferric salt. The strip is dipped in urine and the results are read by comparing the color at the end of 30 seconds with a chart made up of gray to gray-green color blocks representing 0, 15, 40 and 100 mgm of phenylpyruvic acid per 100 ml of urine.

When mixed with an equal volume of 0.32% 2, 4-dinitrophenylhydrazine in 1 N hydrochloric acid, urine containing phenylpyruvic acid will form an immediate yellow precipitate. Other keto acids give a similar reaction which may be useful in the diagnosis of maple sugar urine disease through the detection of the keto acids of leucine, isoleucine and valine.[29]

All three of the urine tests are reliable, although the ferric chloride test is more easily interpreted than the other two, particularly at the 5 mgm% level.[25]

Identification of Carriers

Knox and Messinger[30] found that the basal levels of serum phenylalanine in fasting subjects were higher in heterozygotes than in normal individuals. However, neither the basal levels nor the levels obtained after phenylalanine tolerance tests gave a clear enough separation between the two groups.

A more satisfactory approach is based on the principle that it is possible to determine the activity of phenylalanine hydroxylase in any given individual by measuring how much of the normal end product, tyrosine, is produced after a priming dose of phenylalanine has been given. Anderson et al.[31] have found that homozygous phenylketonurics show little or no rise in plasma tyrosine levels. Heterozygotes respond with a minimal increase while normal subjects make twice as much tyrosine as the heterozygotes, with no significant overlapping between the two groups.

Treatment

The current goal of dietary therapy is to maintain the serum phenylalanine levels between 3 and 8 mgm%.[32, 35] With several deaths attributed to phenylalanine deficiency, the risks of an excessively stringent restriction of phenylalanine intake are clear.[25] Both the safety and the efficacy of the treatment program should, therefore, be guided by the results of periodic serum phenylalanine determinations.

Since the costs of the low phenylalanine diet are unduly burdensome, the State Department of Health has made provisions for supplying the special dietary products. Any physician who is treating a child with phenylketonuria should notify the State Department of Health of this fact, and request authorization to be sent to the pharmacy which will supply the product. After authorization has been issued, the pharmacist

should send his statements directly to the State Department of Health.

The duration of therapy remains an unsettled issue.[33] There is some evidence[34] that treatment is necessary only during early childhood while the nervous system is still developing.

Summary

Phenylketonuria is an inborn error of phenylalanine metabolism, manifested by mental retardation, high serum phenylalanine levels and the excretion of phenylpyruvic acid in the urine. The mental retardation can be prevented by early dietary treatment.

On the basis of a nationwide incidence of 1:10,000 and an annual birth rate of about 18,000 in the state, South Dakota should probably find two new cases of phenylketonuria each year.

Ideally, serum phenylalanine determinations should be run on all newborn infants before they are discharged from the hospital, and after they have been on milk feedings for at least 24 hours. If the serum phenylalanine level is greater than 3 mgm% on the second to third day of life, and greater than 4 mgm% on the third to fifth day, then the result is interpreted as a presumptive positive and the infant should be followed with serial determinations. If these show consistent elevations above 15 mgm%, the diagnosis is established.

Some normal infants, premature infants as a group and infants who are heterozygous carriers, may show increased levels for a while, but these infants do not excrete phenylpyruvic acid in the urine.

Urine tests for phenylpyruvic acid when the infant reaches two to six weeks of age are of value at the time of the first office visit. Positive tests help to confirm the diagnosis of phenylketonuria.

A by-product of newborn screening programs has been the subsequent detection of carriers and undiagnosed cases in parents and siblings of infants with increased concentrations of serum phenylalanine.

There may be some justification for testing all pregnant women for phenylketonuria, since high serum phenylalanine levels in pregnancy have been associated with permanent fetal brain damage. In these cases, the infants were retarded but did not have phenylketonuria themselves.

The fluorimetric procedure for determination of serum phenylalanine is recommended. Presumptive positive results obtained by the Guthrie test should be confirmed by the more precise fluorimetric method, or by some other quantitative procedure such as the enzymatic method of La Du.

Carriers can be identified by measuring the tyrosine levels in the serum after a loading dose of phenylalanine has been given.

Dietary treatment should be guided by the results of periodic serum phenylalanine determinations, with the therapeutic goal being a level between 3 and 8 mgm%.

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THE FUTURE SUPPLY OF PHYSICIANS WITH SPECIAL REFERENCE TO SOUTH DAKOTA

by

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Vermillion, South Dakota

From the Department of Pathology
University of South Dakota School of Medicine
Vermillion, South Dakota

The Subcommittee on Manpower of the President's Commission on Heart Disease, Cancer and Stroke[1] concludes that: "the manpower needs for physicians and other highly skilled health personnel, caused by our expanding economy, our enlarging population, and our increased opportunities, are so great as to be unattainable during the next decade." Other reports similarly indicate that the years ahead will see a diminishing supply of physicians. In part, this will be caused by inability of medical schools to produce enough graduates. In part, it will be due to ever-increasing demands on medical manpower brought about by new programs, many of them federally inspired, designed to increase the scope and availability of health care.

In the March 23, 1963 issue of **U. S. News and World Report,**[2] Dr. Luther L. Terry, U. S. Surgeon General, is reported as having told a Congressional Committee: "Over the past 10 years the output of our medical schools has lagged behind the population growth. The physician-population ratio has stayed almost constant only because foreign-trained physicians have filled such a large part of the gap between population growth and medical school output." Dr. Terry noted that adequate medical care takes about one physician for every 1,000 people. Yet, he reported, more than two-thirds of 3,101 counties in the U. S. had only one physician for every 2,000 or more.

An indication of the need for doctors is the extensive use of foreign-trained graduates in U. S. hospitals. Peterson and Pennell[3] of the U. S. Public Health Service indicated in 1963 that: "The number of foreign physicians in training as interns and residents is approximately 25% of all such positions filled in 1960-1961." It was stated further that: "the extent of our dependence on foreign-educated physicians who immigrate and become United States licentiates is indicated as nearly 20% of the annual number of new additions to the profession." The number of foreign-trained physicians is equivalent to the output of 14 to 16 average-sized U. S. medical schools. It has been estimated that more than half the residents in seven states are from abroad, two of these states being North Dakota and South Dakota.

Physician-Population Ratios:

Predictions of a future shortage of physicians are usually based upon estimates of a probable decrease in ratio of physicians to population. A comprehensive study of the problem is the report, **Physicians for a Growing America**[4] from the Surgeon General's consultant group on medical education under the chairmanship of Frank Bane. According to the Bane Report, there were in the United States in 1959 a total of 235,000 doctors of medicine, a ratio of 133 M.D.s per 100,000 population. When osteopaths were included, as is often done in computing the ratios, the number was 141. The ratio varied little over the previous 20 years. The report set as a minimum goal for 1975 the maintenance of a physician-population ratio of 133 per 100,000, or 1 doctor per 750 people. Based on a U. S. census estimate of 235 million population by 1975, a total of 330,000 doctors of medicine and osteopathy would be required. This would necessitate the annual graduation of 11,000 students, an increase of about 3,600 per year over the 1959 figures of 6,900 medical students and 470 osteopathic students. This would be equivalent to the output of 20 to 24 new schools of medicine. The report by Peterson and Pennell[3] predicted that the doctor (M.D.) ratio would decrease to 132 by 1970 and 129 by 1975.

Although the relation of the number of physicians to the population is a useful way to refer to the national supply of doctors, the given ratio may vary considerably depending upon which physicians and type of practice are included and to what population the numbers are related. Thus, the **Health Manpower Source Book**[5] published in October, 1964 quotes a ratio of 149 physicians (M.D.s and D.O.s) per 100,000 as of December 31, 1963. For doctors of medicine alone, the corresponding ratio would be 142. Ratios given for 1950, 1955 and 1960 are 149, 150 and 148, indicating that there has been little change over these years. The problem of establishing satisfactory criteria for figuring the physician-population ratio has recently been the subject of a special study.[6]

These ratios can be misleading with respect to patient care. Not all of the physicians included are in private practice. The number of physicians in private practice per 100,000 population dropped from 108 in 1931 to 91 in 1959, and it is estimated it will be about 85 by 1975. The number of physicians engaged in full-time teaching, research, public health, industrial medicine and military service has quadrupled in the past 30 years and the trend is likely to continue.

The use of physician-population ratios for forecasting needs is not endorsed by all who are studying the situation. Jacob P. Meerman, Ph.D.,[7] writing from the Economic Research Department of the American Medical Association in September, 1961, considered these projections subject to wide margins of error. He points out that the Bureau of Census in 1948 forecast a 1960 population of 162 million, instead of 180 million, a 10% error. The Bane report[4] of 1959 estimates a 1975 population of 235 million. A different report[3] gives an estimate of over 238 million. It appears that as 1975 draws nearer the estimates of that year's population become greater.

Projecting Future Needs for South Dakota:

Maryland rejected the physician-population ratio as a basis for state planning since it lacked the refinement necessary to be applied to a small population group such as a state.[8] Also, the health of the people depends not only on the supply of physicians, but their geographical location, the age, race and educational level of the people, economy, climate and many other factors.

In estimating future needs for Maryland the following approach was taken: There were 151 graduates from the University of Maryland and the Johns Hopkins medical schools in 1959 when the national population was 174,409,000. This was a ratio of 0.866 doctors graduated in Maryland for each 1,000,000 national population in 1959. Applying the ratio of 0.866 to the projected 1975 population of over 235 million, Maryland would require 204 graduates in 1975. It was concluded that, allowing for attrition, Maryland schools should plan to enroll by 1971, for 1975 graduation, 240 medical students. This was 50 more than currently matriculating in the first-year class. This projection assumes continued foreign immigration. Since this cannot be relied upon, it was recommended that 42 additional openings be made to bring the total to 92. The 42 openings were Maryland's responsibility for replacement of foreign physicians. Since Maryland in 1959 graduated 1 physician for every 45.4 of the 6,860 physicians graduated in the U. S., it was suggested that Maryland be responsible for 1/45.4th of the 1,626 foreign graduates licensed in 1959. Allowing for attrition, this meant 42 additional first-year medical school openings. The 92 students represented a 49% increase in capacity by 1971.

Applying this technique to South Dakota's medical school would give the following: If we assume a graduating class of 40 in 1959 with a national population of 174,409,000, we have a ratio of 0.229 South Dakota graduates per 1,000,000 population. Applying this to the recent 1975 estimate of 238 million, we find that there should be 55 graduates in that year. Allowing for attrition, the University Medical School should enroll about 65 students in 1973. The state may also wish to assume responsibility for replacement of foreign physicians. If we assume 40 students graduated in 1959 in relation to 6,860 physicians graduated in the country, we have a ratio of 1 student graduated at South Dakota University for every 171.5 physicians graduated in the U. S. Our responsibility would be 1/171.5 of the 1,626 foreign graduates licensed in 1959 or, allowing for attrition, approximately 12 additional first year students. Thus, we should have a medical school capacity of 77 by 1973, almost a 70% increase in the present enrollment, now 46, in the next 8 years.

Dr. Edwin H. Shaw, Jr.,[9] Professor of Biochemistry of the University of South Dakota School of Medicine, has attempted to estimate the number of students who will present for admission to medical school in the future, based on birth rates and on past and expected high

school and college enrollment. For 1970 one would expect at least 44 qualified in-state students to present for admission which, with other students, would make a total of about 64. By 1973 there should be 51 qualified in-state applicants, with a total of 77 presenting for admission, coincidentally the same estimate arrived at by the Maryland approach. If there was increased interest on the part of South Dakota students in studying medicine, which appears likely, the figures would be higher.

The President's Commission on Heart Disease, Cancer and Stroke,[1] projecting from predictions of bachelor degrees to be awarded in 1975, estimates a manpower potential for more than 18,000 new medical and osteopathic students. This is more than double the number beginning their professional education in 1961. According to this prediction, we should have the potential for at least 90 students for South Dakota's medical school in 1975.

Regional Distribution of Physicians:

Between 1940 and 1959 the West and South improved their supply of physician manpower, whereas the Northeast and particularly the North Central area showed a decline. The need for increasing the output of physicians who will remain in the area in which they graduate is greater in the North Central region than anywhere else in the country.

In 1959 the ratio of all non-federal physicians (M.D. and D.O.) to 100,000 civilians was 133 in the U. S. The highest ratio was 311 in the District of Columbia. States in the Northeast had an average ratio of 167, whereas in the North Central region the ratio was 121. In South Dakota it was 78, the only lower ratios being South Carolina 77, Alabama 77, and Mississippi 76. North Dakota had a ratio of 80, Iowa 114, Nebraska 110, and Minnesota 134. The Health Manpower Source Book,[5] determining the ratio in a slightly different way, identifies that as of December 31, 1963 there were 67 non-federal M.D.s per 100,000 civilian population in South Dakota. This compares with 88 in North Dakota, 101 in Iowa, 111 in Nebraska, 143 in Minnesota, 204 in New York and 355 in the District of Columbia. The ratio averages about 143 in metropolitan and adjacent counties and 81 in isolated rural and semi-rural areas. Recent data from the A.M.A. Directory Report Service, the U. S. Department of Commerce and the Bureau of Census and Office of Business Economics, identify that currently in South Dakota there are 1,589 people per practicing M.D.[10] This contrasts with 623 people per doctor in New York. Corresponding figures are for Iowa 1,171; Nebraska 1,080; and North Dakota 1,241. South Dakota is at the bottom of a list of 50 states with respect to physician-population ratio.

Shortages of physicians in communities and within specialties often represent problems of distribution rather than need for more physicians. The July 1962 issue of **New Medical Materia** presents a list (corrected in the September 1962 issue) of 1,442 towns in the U. S. with 500 or more population which do not have M.D.s or D.O.s living in them or within 5 miles.[11] Between 1959 and 1962 there was a 40% increase in such towns. In South Dakota in 1959 there were 15 towns and in 1962 nineteen towns listed as requiring physicians.

The Executive Secretary of the South Dakota State Medical Association[12] indicated in 1963 that there were about 30 communities in the state seeking physicians, about half of which could actually support one. In addition, there were 15 to 20 communities requiring a second doctor. It was his opinion that a 10% increase in the physician population (then about 510) would obviate any shortage.

The physicians' placement service of the American Medical Association has had more openings than it can fill for general practitioners, pediatricians, E.E.N.T. physicians and psychiatrists in recent years. The largest number of openings has been in the Midwestern states, particularly in smaller cities.

The Outlook for the Future:

The report of the Surgeon General's Consultant Group on Medical Education[4] noted grimly: ". . . . that even if all the recommendations of the Bane Committee could be implemented in full within the next year, the chances of influencing the downward trend in our physician-population ratio before 1975 are practically nil." The recommendations of this 1959 report still await full action. The President's Commission on Heart Disease, Cancer, and Stroke[1] is equally pessimistic. It estimates there is a shortage of 20,000 doctors for private practice at the present and states that if the Nation's medical and osteopathic schools were able to expand their output by 25% immediately it would require 10 years to make up this deficit alone. It notes that if we are to meet our minimum health needs we will continue to depend on extensive importation of foreign-trained physicians.

The doctor shortage will be alleviated partially through more efficient use of available

physicians and greater use of paramedical personnel. Nevertheless, more doctors will be needed if the sweeping recommendations of the President's Commission are to be implemented. The Commission considers: ". . . the present shortages to be so critical, and their further neglect so disastrous, that Federal programs must be undertaken as the only solution which can be found in time."[1] It is therefore proposed that there be an entire system of programs providing full and direct support of medical education.

It is likely that there will always be a shortage of physicians. It is also likely that future efforts to remedy the situation will be based on increased federal support of medical education and that this will be stimulated by the need for medical manpower to carry out extensive new government programs of health care.

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MINUTES
EXECUTIVE COMMITTEE

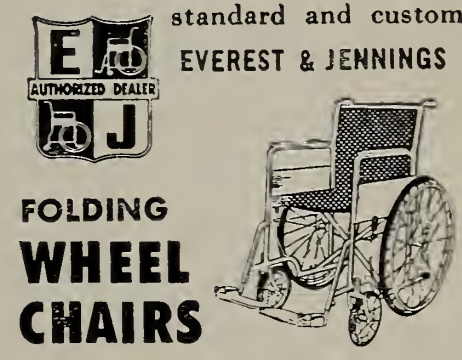
December 14, 1965 — 11:00 A.M.

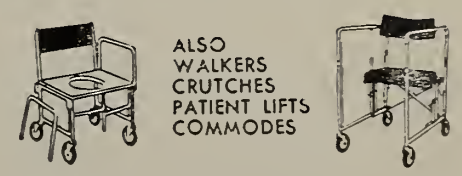
Pierre, South Dakota

Present for the meeting of the Executive Committee were: Drs. Paul Hohm, John Stransky, and Jack Elston. Others present were: Dr. Robert Quinn, Chairman of the Commission on Legislation, Dr. H. Russell Brown, President of South Dakota Medical Service, Inc., and Mr. Richard C. Erickson and Randall Tuffs, staff. The executive committee met at 11:00 A.M. in preparation for a meeting with the State Welfare Commission at 1:30 P.M. The executive committee discussed a change of date for the Council meeting and decided to set the meeting for Saturday, January 8, at 5:00 P.M. in Huron, South Dakota.

A discussion of a date for a special meeting of the Corporate Body of South Dakota Blue Shield was held. It was decided that the special meeting would be called for 10:00 A.M. on Sunday, January 9, to be held in Huron, South Dakota, at The Inn Motor Hotel.

The Executive committee then discussed how they would proceed with the State Medical Association's request to the Welfare Commission for implementation of the new Relative Value Study for both the OAA and MAA program. They also discussed the present effect of "Medicare" on Welfare Programs and the implementation of Title 19 for the state of South Dakota. The meeting adjourned at 1:15 P.M. and the committee proceeded to meet with the State Welfare Commission.





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THE CARCINOID SYNDROME

In the last few years much attention has been directed to the diagnosis of carcinoid tumors. These lesions are of considerable clinical interest because they are known to produce serotonin, a compound with marked pharmacologic activity. Much effort has been devoted to the study of the biochemistry and pharmacology of serotonin and its derivatives. One of the principal urinary excretion products of serotonin is 5-hydroxyindoleacetic acid (5HIAA) a compound which can readily be detected and measured in the urine, thus providing a means of detecting carcinoid tumors.

The cell of origin of the carcinoid tumor is the so-called argentaffin cell (Kulchitsky cell) usually found in the gastrointestinal mucosa. With ordinary stains this cell has no distinctive characteristic, but with silver stains this cell contains silver positive granules.

Carcinoids are most common in the gastrointestinal tract although they have been found elsewhere. Approximately two-thirds of all carcinoids arise in the appendix. Most of the carcinoids arising outside the appendix are found in the terminal ileum and other portions of the gastrointestinal tract. A few carcinoids arise in the lung and others have been described in the gallbladder and even in ovarian teratomas.

Carcinoids of the appendix have a very low degree of invasiveness. They may penetrate the wall or even metastasize to regional lymph nodes. However, there is not a single well documented case in which a carcinoid of the appendix extended beyond the regional lymphatics. On the other hand, many of the carcinoids arising outside of the appendix metastasize widely. Moreover, there may be multiple primary lesions, particularly in the ileum.

Carcinoids usually metastasize very slowly and as many as 15-25 years may elapse before these metastases are extensive enough to cause death. For this reason surgical excision should be attempted even of large secondary hepatic growths.

The syndrome associated with functionally active carcinoid tumors is characterized by sudden flushing of the skin, an unusual type of changing cyanosis of patchy distribution, frequent watery stools, "asthma," valvular disease of the right side of the heart, and congestive cardiac failure. These changes are explained on the basis of excessive secretion of serotonin by the primary lesion and its metastases. Metastasis to the liver is thought to be an important factor in the genesis of this syndrome. The reason for this may be that serotonin is inactivated by an amine oxidase in the liver. With metastases to the liver, this step may be by passed releasing large quantities of serotonin into the blood. Furthermore with large metastases the rate of serotonin production probably exceeds its rate of destruction allowing it to accumulate in the blood.

The major degradation product of serotonin is 5-hydroxy 3-indoleacetic acid (5HIAA) which is excreted in the urine. Normally only a small amount of 5HIAA is found in the urine. (The maximal normal output is approximately 2-8 mg/day.) Levels above 25 mg/day are strongly suggestive of functioning carcinoid tumors. A fairly simple reliable procedure for the detection of urinary 5HIAA is available. This is based upon a purple color produced by the reaction of 5-hydroxyindole compounds with 1 nitroso-2-napthol in the presence of nitrous acid. A semiquantitative test or screening test is all that is necessary as far as diagnostic purposes are concerned. However, in following patients who have undergone surgery a quantitative determination is desirable. Both tests should be performed on an aliquot of a 24 hour urine specimen collected in approximately 10-15 ml. of glacial acetic acid. Patients should be on a banana or papaya free diet while urine is being collected as the intake of these results in the increased excretion of 5HIAA. The amount of 5HIAA excreted in the urine may vary from time to time, therefore more than one determination may be necessary.

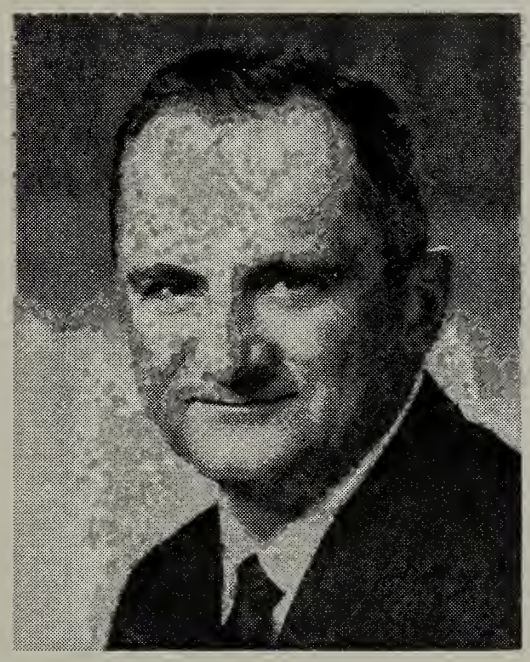
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PRESIDENT'S PAGE



Dear Doctor Members:

The time has come when nonpsychiatrist medical practitioners need to develop an interest in psychiatry. The public interest in mental health, with all types of federal and state grants and aids stimulating the education of the general public, is growing so rapidly that it behooves us to sharpen our wits and be prepared to meet this growing need.

We may or may not call it psychiatry, but we have and always will be caring for the mental ills of our patients. We surely are in agreement that many of the organic diseases are usually accompanied by or exaggerated by the presence of psychosomatic diseases.

The general practitioner's place, apart from the psychiatrist's, carries a very important role in the care of the mentally ill. We are in a position, and it is our duty, to try to alleviate mental tensions in our patients. It should also be our duty to know when and where to refer the patients that need psychiatric care beyond the scope that we are able to administer.

This problem has stimulated a workshop among the AGP, the APA, and members of our medical society to study the need for educating nonpsychiatric medical men in filling the void in caring for the whole patient, not forgetting the emotional part of his problem. It is quite understandable that corrective measures at an early date in a mild mental illness can frequently keep the patient in the general practitioner's office, leaving the too few psychiatrists available to handle the more severe cases.

Another expression of opinion evolving from this workshop revealed that more consultations on a local level, without actual referral of the patient, can do much in helping alleviate our lack of personnel for referral of the severe case.

Realizing the existing need in our own state, the Medical Association has set up a committee of our doctors and psychiatrists to work out programs to encourage nonpsychiatrist medical practitioners to develop an interest in psychiatry; for the simple reason that the family doctor of today needs to be able to help his patients resolve their minor mental anxieties. Hopefully this could lessen the number of highly complex cases needing care in the already overcrowded psychiatrists' offices. This committee will also endeavor to establish better lines of communication between the psychiatrist and the medical practitioner.

Fraternally yours,

Paul Hohm, M.D.
President
South Dakota State Medical Association

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In *men:* in whom trichomonads have been demonstrated, one 250-mg. oral tablet b.i.d. for ten days.

Contraindications

Pregnancy; disease of the central nervous system; evidence or history of blood dyscrasia.

Precautions and Side Effects

Complete blood cell counts should be made before and after therapy, especially if a second course is necessary.

Infrequent and minor side effects include: nausea, unpleasant taste, furry tongue, headache, darkened urine, diarrhea, dizziness, dryness of mouth or vagina, skin rash, dysuria, depression, insomnia, edema. Elimination of trichomonads may aggravate moniliasis.

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SEARLE

Research in the Service of Medicine

CYSTOSARCOMA PHYLLODES:

A Review of Three Cases

by

G. Robert Bartron, M.D.
Bartron Clinic
Watertown, South Dakota

and

Richard J. Weaver, M.D.
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Cystosarcoma phyllodes is a comparatively rare breast lesion. "The infrequency of these giant tumors is such that they are practically museum curiosities." (Stewart). Thirteen (13) cases were seen at the Mayo Clinic between 1903 and 1943 and twenty-two (22) cases between 1907 and 1956. Seventy-seven (77) patients were recorded from Memorial Hospital in New York in a twenty-year period. Ninety-three (93) cases were reported from the same hospital in the thirteen (13) year period of 1950-1962. Those persons in institutions serving large Negro populations may see the lesion more frequently as it is reportedly more common in that race.

The lesion most commonly occurs in the sixth decade, whereas the common fibroadenoma occurs in the fifth. More occur in the left breast and they have a tendency to grow very rapidly, often from a small lesion which has been known to the patient for many years. Cutler has reported such a case in a physician's daughter which grew from a small traumatically-induced nodule of twenty-five (25) years' duration.

Because they can grow so rapidly there may well be a tendency on the part of the physician to disbelieve the story of the patient who presents with a lesion of 20-25 cm. and gives a history of only two months' growth.

The term cystosarcoma phyllodes was introduced by Johannes Mueller in 1838. Its perpetuation today is unfortunate because it is now known that most of the lesions given this diagnosis are benign. However, Mueller's use of the word "sarcoma" was a gross term to describe a fleshy mass. It did not necessarily imply connective tissue malignancy and had no microscopic connotation.

The lesion we know today as cystosarcoma phyllodes is in reality a fibroadenoma with a relative overgrowth of connective tissue stroma demonstrated by increased amount of connective tissue as well as an increase in cellularity.

Numerous other appellations have been applied to this tumor, e.g. fibroadenoma and giant intracanalicular myxoma. However, cystosarcoma need not be large. In fact, with modern more prompt treatment of breast lumps they are diminishing in size. The three tumors which we report range from 2.8 cm. to 17.0 cm. in diameter. Formerly, it was thought the tumors were usually 10 cm. or larger.

Some tumors have a "histologically malignant" appearance in which the stroma cells react with hypertrophy, hyperplasia, anaplasia, and pleomorphism. In general, it is the picture of fibrosarcoma, although bone and cartilage can also occur. However, it was Dr. Treves' prediction (and sustained by our experience) that it is impossible to classify these tumors as malignant unless they have recurred with a histologically malignant picture or a metastasis. It must be admitted that with cystosarcoma we cannot predict the outcome by cytology alone, but may have to classify these tumors ultimately by their clinical behavior.

The lesion is well-encapsulated and the moist or slimy cut surface presents various sized gray lobules or frons between which are numerous cleft spaces usually lined by epithelium.

Microscopically, the lesions show a marked hyperplasia of edematous stroma. In the benign ones the cells are elongated or spindle-shaped with small dark elongated nuclei. Between these cells there is a generous amount of myxomatous



Figure 1.
Photomicrograph of lesion in Case 1 showing general architecture of fibroadenoma. H and E, original magnification 100 X.



Figure 2.
Stroma of Case 1 showing cells and nuclei with malignant characteristics. H and E, original magnification 450 X.

stroma. Compressed and elongated ducts are present. These will vary in number from area to area and sometimes numerous areas will have to be sampled before epithelial elements are found.

Although these tumors seldom metastasize to regional nodes, it would appear prudent at this time to perform radical mastectomy for the malignant lesions and simple mastectomy for the benign ones. The following three cases serve to illustrate microscopically benign and malignant tumors:

Case I

Mrs. H. B., a fifty-year (50) old white female, was first seen in 1956, complaining of a lump in the right breast. The tumor was in the right upper quadrant, was solitary and freely movable. Simple excision was done. Cystic mastitis was noted in the surrounding breast in surgery. No adenopathy was noted.

Grossly, the specimen consisted of two pieces of fibro-adipose tissue. The largest measured 8 x 6 cm. and on cross section was tough and dull white.

Microscopic sections (Figure 1) showed a fibroadenoma. The stromal cells (Figure 2) were large and irregular with hyperchromatic nuclei. Irregular mitoses were noted. The epithelial cells were somewhat hyperplastic and well-differentiated.

Dr. Frank Vellios of the Indiana University Medical School saw this case in consultation and agreed with the diagnosis of sarcomatous degeneration in a fibroadenoma (cystosarcoma phyllodes).

The patient made an uneventful recovery. At last report, in December, 1964, there was no evidence of recurrence and no complaints.

Case II

Mrs. A. A., a fifty-one (51) year old white female, was seen in June, 1964, with the chief complaint of a large tumor of the left breast (Figure 3). (We have no clinical photograph of this particular patient. However, Figure 3 is completely representative of her appearance. This photograph is from Cutler's **Tumors of the Breast,** by permission of the J. B. Lippincott Company).

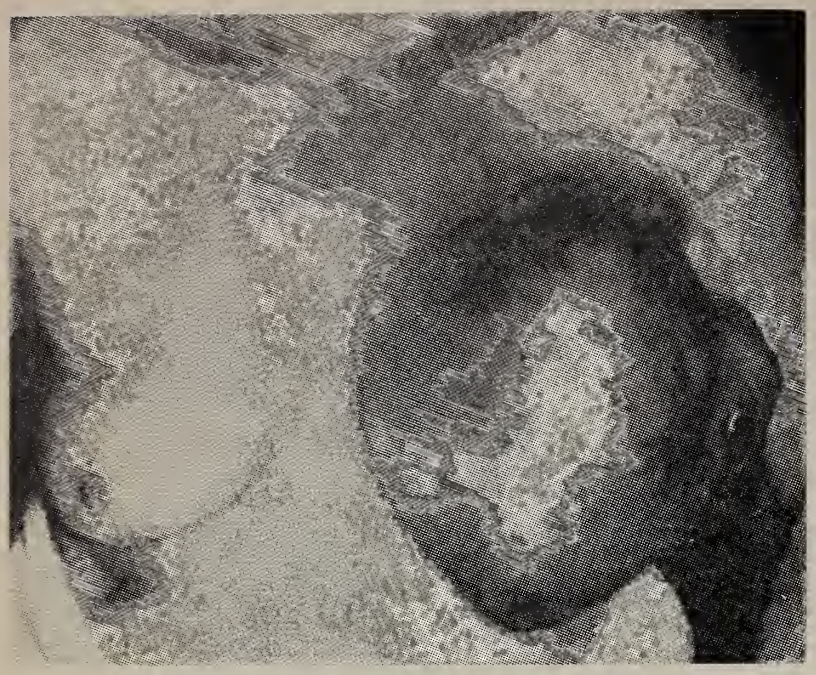


Figure 3.

Left breast typical of that presented clinically by patient of Case 2. Courtesy J. B. Lippincott Company. (See text and acknowledgements).

She had first become aware of this mass two and one-half months previously. It had grown rapidly and caused her concern, but she delayed in consulting her physician because she did not want to interfere with their daughter's schooling if definitive treatment was indicated.

An examination showed a well-developed, overly nourished, lopsided white female. A huge lobular mass involved the entire left breast making it three times the size of the right one. The skin appeared taut and glistening and was reddened over the lobules. Palpation over the apices of the lobulations gave a fluctuant feeling. There was no calor. The nipple was displaced posteriorly. No axillary masses were palpated. A radical mastectomy was done. The specimen (Figure 4) measured 35 x 16 x 10 cm.

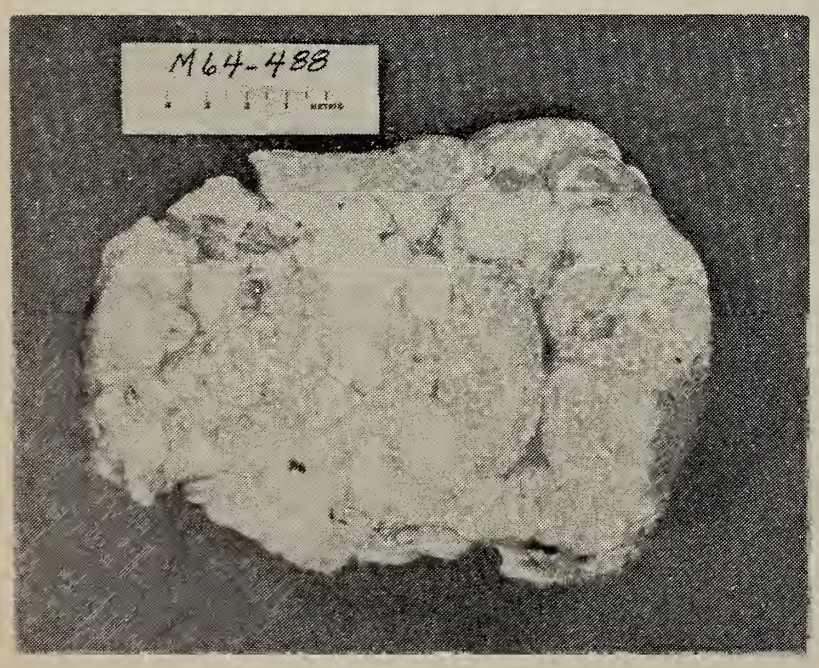


Figure 4.

Gross specimen from Case 2 showing gray, mucoid, lobulated cut surface.

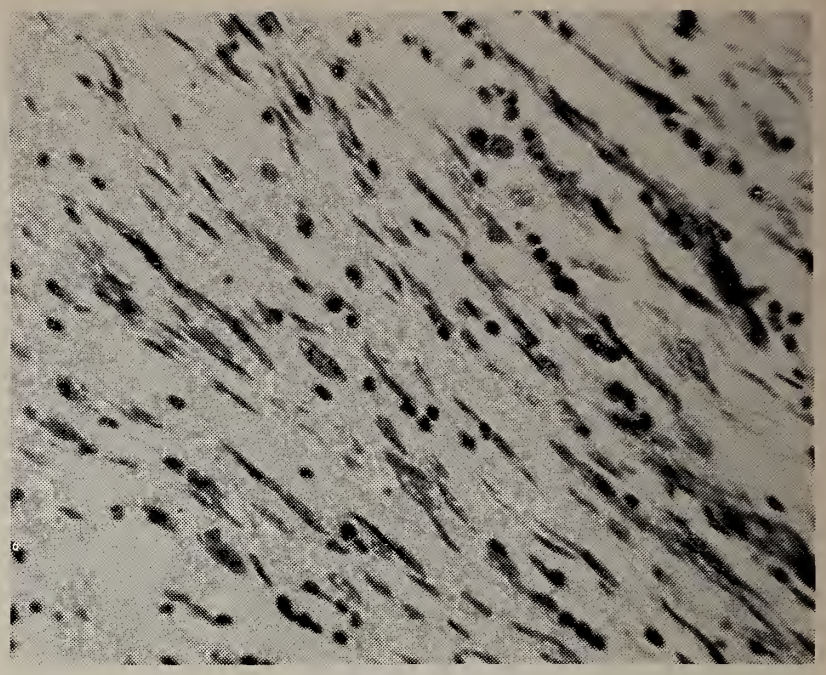


Figure 5.

Cellular stroma of Case 2 sprinkled with inflammatory cells. H and E, original magnification 100 X.

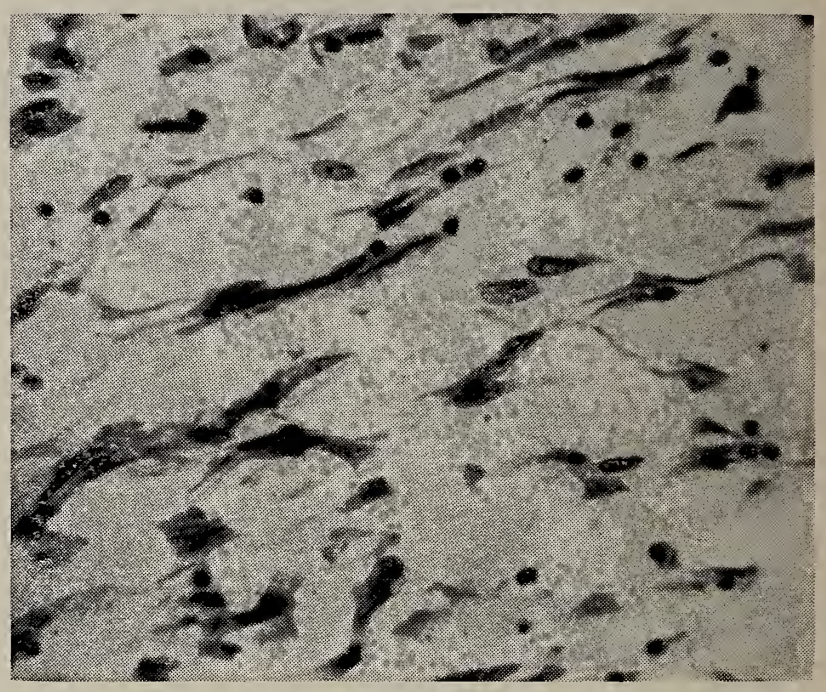


Figure 6.

Cellular stroma of Case 2 showing irregular hyperplastic nuclei. H and E, original magnification 450 X.

Directly underlying the skin was a 17 cm. greatest diameter mass of gelatinous gray-pink-yellow tissue which compressed the ambiant breast stroma from which it was poorly demarcated. Individual lobules of tumor mass varied from 0.5 to 4.0 cm. Also submitted were various lymph nodes.

Microscopic examination (Figures 5 and 6) showed a prominently edematous myxomatous stroma in which were varying numbers of small spindle-shaped cells with elongated nuclei. In some cases the nuclei were plumper than in others. No mitoses were noted. There were also areas of degeneration in which there were few nuclei. The stroma was sprinkled with acute and chronic inflammatory cells. Ducts (Figure 7) were extremely rare and these were

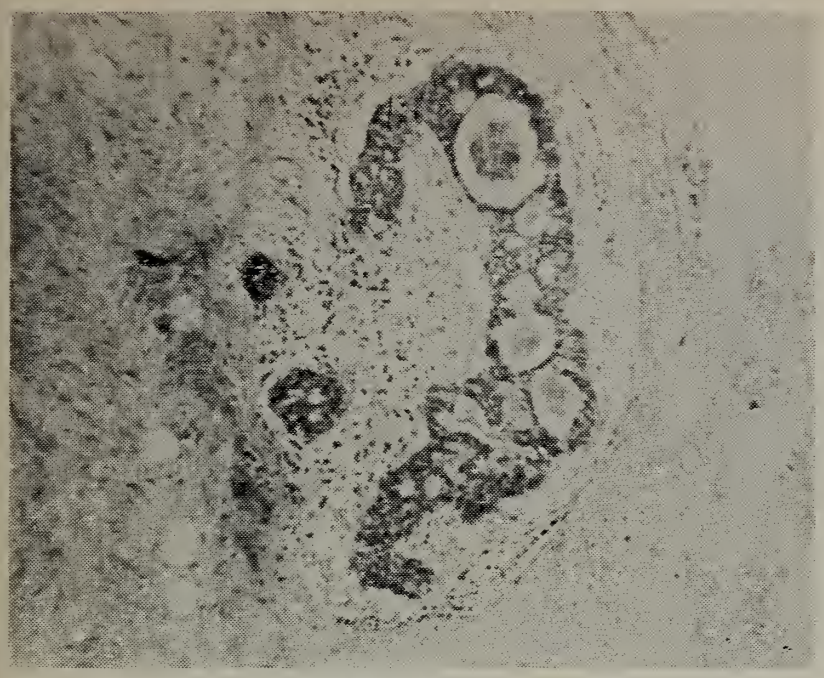


Figure 7.
One of few ductal areas found in Case 2 showing benign hyperplasia of epithelial cells. H and E, original magnification 35 X.

lined by hyperplastic epithelium. The lymph nodes showed only reactive hyperplasia.

Case III

A 37-year old white female was first seen July 18, 1963, with a lump in the right breast. The lesion was excised with a diagnosis of benign fibrocystic disease.

The patient was readmitted eleven months later with a firm nodular mass in the area of the previous biopsy. The admitting diagnosis was fibroadenoma.

The mass was excised and the specimen contained a 2.8 cm. circumscript gray-tan nodule of firm tissue with a mucinous surface. A definite capsule was not noted. Microscopic sections (Figure 8) were characteristic of cystosarcoma phyllodes. The pathologist noted the possibility of recurrence although the lesion appeared to be completely excised.

Six months later the patient was readmitted with another mass in the same area. A simple mastectomy was deemed prudent.

SUMMARY

The uncommon occurrence and natural history of cystosarcoma phyllodes have been discussed. Three cases have been presented, of which one was microscopically malignant and the other two were benign. The former was locally excised and has not recurred in over eight and one-half years. One patient with a benign-appearing tumor is free of disease after one year. The third patient had a local recurrence six months after the first diagnosis. Simple mastectomy was done and the patient is free of the disease eighteen months later. However, it must be emphasized that it is extremely difficult to predict the biological behavior of cystosarcoma from the histologic appearance alone.

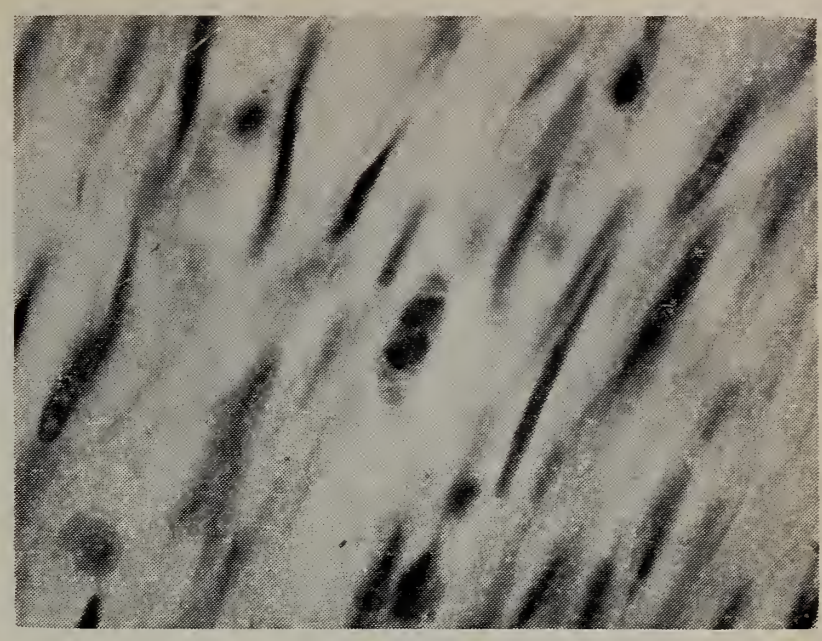


Figure 8.
Stroma of original excisional biopsy of Case 3 including mitosis in center of field. H and E, original magnification 100 X.
Gross examination showed a 2.2 x 1.5 cm. brown-gray homogenous nodule with a mucoid surface. It was immediately adjacent to the skin. There were also a few tiny cysts scattered through the breast tissue.
Microscopic examination was again characteristic of cystosarcoma phyllodes.

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Student Essay Contest

The William Osler Medal of the American Association for the History of Medicine is awarded for the best unpublished essay on a medico-historical subject written by a student in one of the medical schools in the United States or Canada. All students who are candidates for the degree of Doctor of Medicine, or who graduated in 1965, are eligible. This medal, first awarded in 1942, commemorates the great physician, Sir William Osler, who stimulated an interest in the humanities among students and physicians alike.

Essays should demonstrate either original research or an unusual appreciation and understanding of a medico-historical problem. Maximum length is 10,000 words. The prize-winning essay will be submitted to the Editorial Committee of the Association, which may recommend it for publication in the **Bulletin of the History of Medicine.**

Essays must be submitted by March 23, 1966, to the Chairman of the Osler Medal Committee, William K. Beatty, Librarian and Professor of Medical Bibliography, Northwestern University Medical School, 303 East Chicago Avenue, Chicago, Illinois 60611.



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Robert Van Demark, M.D., Editor
South Dakota Journal of Medicine
1701 South Minnesota Avenue
Sioux Falls, South Dakota

Dear Doctor Van Demark:

Enclosed is information pertaining to improper disposal of vials, cartridges and disposable type syringes and needles.

This particular incident was relatively harmless but if it had not been promptly reported and investigated, it could have been of a very serious nature.

On behalf of the Sioux Falls Board of Health and the City Police Department we submit this information, picture and negative to you in hopes that you could have a story appear in the South Dakota Journal of Medicine in the very near future. Proper disposal of drugs, syringes and needles should be of concern to the Medical, Dental and Pharmaceutical Professions so we are sending similar information to the Pharmaceutical and Dental Association for reprint in their respective publications.

If there are any questions or if this Department can be of assistance, please advise.

FOR THE BOARD OF HEALTH:

Sincerely,
Dr. N. E. Wessman
Health Officer

COMMENTS ON THE DISPOSITION OF VIALS AND DISPOSABLE SYRINGES AND NEEDLES

On December 4, 1965, the Sioux Falls Police Department were notified by a parent of a fifteen year old boy who had in his possession a syringe and needle intact. When questioned by his parents the boy said his friend had a lot of them hidden in his garage.

The Police Department made an investigation, and when questioning the boy about the whereabouts of the syringes and needles, he brought out a box from the garage containing 150 disposable type needles and syringes intact, 8 cartridges of novocain half to three fourths full, 16 vials of various drugs and vaccines and an undetermined amount of syringes, needles, nearly empty or empty novocain cartridges. The boy had picked these articles up at various **Doctors'** and **Dentists' offices** from the **garbage cans** since mid-summer, to date.



Many of the syringes were not empty nor were vials of vaccines or cartridges of novocain. The boy stated to the investigating officer that the partially empty vials and cartridges were emptied into others to make full bottles out of them. When questioned as to what the boy's intentions were regarding his supply of drugs, syringes and needles, he stated that he and a friend had only used them on a rat which they injected with novocain. The rat died shortly after the injections. A rabbit was also injected, but had disappeared. The boys did not know what happened to it. Further investigation revealed that syringes and needles of the disposable type had been used by school children to refill cartridge type pens.

A recent and similar incident occurred where a young boy had picked up items of the same nature from the trash containers located behind a Drug Store. The father of this boy immediately notified the Pharmacist and the Police Department.

This problem involves people from the Medical, Dental and Pharmaceutical Profession and it is hoped that everyone concerned will take the necessary steps and precautions to properly

dispose of unused drugs, disposable needles and syringes.

It is recommended that needles and syringes be completely emptied and broken, and that all vials and cartridges be completely emptied before disposing of them. It is further recommended that the trash containers be kept inside the building until such time as the trash collector picks them up for disposal.

The investigation has been completed on this case with no apparent harm done. However, the supply of needles and syringes uncovered in this one incident could have given a narcotic a lifetime supply of needles and syringes, or a nice profit from the sale of them.

Complete cooperation from all concerned will eliminate any future hazards such as this incident.

November 9, 1965

Dr. Robert Van Demark
The South Dakota Journal of Medicine
711 North Lake Avenue
Sioux Falls, South Dakota 57104

Dear Dr. Van Demark:

Members of the State medical society frequently play a substantial role in guiding young men and women into medical school. These friendships are often maintained throughout the student's four years at medical school, and the student often seeks advice from his "mentor." For this reason I would like to draw the attention of your readers to the Osler Medal Essay Contest sponsored by the American Association for the History of Medicine. A sheet giving full information is enclosed. I would appreciate it if you would place this information in the appropriate section of your journal.

I shall be happy to answer questions that you, your readers, or the students might have.

Sincerely yours,
William K. Beatty, Chairman
Osler Medal Committee

Editor's Note: — Complete information concerning this essay contest may be found on page 29 of this issue of the Journal.

Where New Drugs Come From?

Few, if any, new drugs or inventions have been commercially developed in countries which do not offer proper patent protection to the inventor. Of the new drugs introduced in the United States from 1941 to 1964, 369 came from the United States, 44 from Switzerland, 33 from Germany, and 28 from the United Kingdom. Equally significant is that 90 per cent of the 369 new drugs originating in the United States came from company laboratories. Editorial in **Michigan Medicine,** (64:766), October 1965.



Dr. Edwin W. Brown, Jr., (seated far left) Associate Medical Director of Project HOPE and Project Director of Project Viet-Nam, points out locations of assignments on a map to the latest group of American Doctors to volunteer two-months' service in South Viet-Nam. The doctors (left to right, seated) Dr. Brown; **Dr. Isaiah Reed Salladay of Pierre, S. D.;** Dr. S. William Kalb, Newark, N. J.; Dr. Wayne G. Parker, Oberlin, Kans.; Dr. John E. Stephens, Columbus, O.; Dr. Julius D. Krombach, Henderson, N. Y.; (standing) Dr. Aaron I. Grollman, Cincinnati, O.; Dr. Warren B. Ross, Nampa, Idaho; Dr. James S. Vanderhoof, Ross, Calif.; Dr. J. Ralph Dunn, Tarboro, N. C.; and Dr. Charles A. Rodman, Minot, N. D. The 10 general practitioners and surgeons were briefed by Dr. Brown in Los Angeles on December 2 and flew to Saigon the next day. As of the first week of January 1966 the following states are represented in Project Viet-Nam: California (8), Connecticut (1), District of Columbia (1), Florida (2), Idaho (1), Illinois (1), Kansas (1), Kentucky (1), Maryland (1), Massachusetts (1), Minnesota (2), Missouri (2), Montana (1), New Hampshire (1), New Jersey (2), New Mexico (2), New York (3), North Carolina (1), North Dakota (1), Ohio (3), Oklahoma (2), Oregon (2), Pennsylvania (1), South Dakota (1), Tennessee (1), Texas (4), Utah (1), Virginia (1), Washington (4).

This is your

MEDICAL ASSOCIATION

News Notes • Changes • Births • News

Pop's Proverb

Better to have done a small job well than a big job poorly.

NEWS NOTES

The Public Health Service Audiovisual Facility has announced the availability of a film demonstrating how a prison inmate can be rehabilitated through the combined efforts of a rehabilitation counselor, case worker and prison officials. It portrays a young man with a scarred face who is constantly in trouble and unable to relate to his environment. This 16-mm, black and white, sound film entitled "The Scar Beneath" is available on free short-term loan from: Public Health Service Audiovisual Facility, Attn: Distribution Unit, Atlanta, Georgia 30333.

* * *

The VA Center at Hot Springs, South Dakota, announces the arrival of **Jan J. Waller, M.D.,** formerly of Bath, New York.

Dr. Waller was born in the Netherlands and graduated from the University of Ubrech medical school there. He received additional training in internal medicine at the New York University post-graduate medical school.

Association of **H. E. Fromm, M.D.,** with the Williams Surgical Clinic in Rapid City has been announced. Dr. Fromm, a native of Corsica, S. Dakota, was graduated from Clear Lake High School and from South Dakota State College with a degree in pharmacy in 1952. He attended medical school at the University of South Dakota, receiving his bachelor's degree in 1955. He received his doctor of medicine degree from Northwestern University Medical School in 1957. Until recently he was associated with the Park Clinic in Livingston, Montana.

Dr. Fromm is certified by the American Board of Surgery.

* * *

E. S. Watson, M.D., Brookings physician and president of the board of directors of the Brookings Area Guidance Center was elected president of the Association of Mental Health Centers at the association's annual fall meeting in Sioux Falls.

* * *

A. P. Reding, M.D., Marion, South Dakota, has been named chairman of the Turner County Salvation Army appeal.

Dean W. L. Hard, of the University of South Dakota School of Medicine, has been appointed as the Representative from South Dakota to the Midwest Regional Scientific Advisory Committee for the United Health Foundations, Inc. This Foundation functions to review and approve research programs sponsored by funds donated through United Funds and similar community contributions. It also serves to encourage the development of research in regional areas and to offer assistance in locating suitable laboratories for research activities.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

Membership of the 85 Blue Shield Plans in the United States, Canada, Puerto Rico, and Jamaica increased during the first three quarters of 1965 to a record 57,286,041. Over half of the increase was acquired in the second quarter. The addition of a new Plan — Windsor, Ontario — contributed 263,445 members to the second quarter gain.

* * *

The 29th Annual Meeting of The New Orleans Graduate Medical Assembly will be held March 7-10, 1966 at The Roosevelt Hotel in New Orleans. This program is acceptable for twenty-nine (29) accredited hours by the American Academy of General Practice. Physicians planning to attend are advised to request hotel reservations without delay. Such reservations should be addressed to Greater New Orleans Tourist and Convention Commission, 400 Royal Street, Suite 203, New Orleans, Louisiana 70130. It is requested, in order that delay in registration may be avoided on opening day, that the registration fee of $25.00 accompany requests for hotel accommodations. Checks should be made payable to The New Orleans Graduate Medical Assembly. An associate membership card will be mailed to each registrant immediately upon receipt of the fee.

* * *

The Pierre District met on December 14, 1965, with 15 members present. **Dr. Paul Hohm,** President of the South Dakota State Medical Association, made his official visitation to the District and discussed the impact of the "Medicare" Law on the medical profession in the state of South Dakota.

R. H. HAYES, M.D. JOINS VIET NAM SURGICAL TEAM

Winner physician and surgeon, **Dr. R. H. Hayes,** has announced that he will become a member of a surgical team in South Viet Nam. Following three to four weeks of training in a special service school, he will join a surgical team in South Viet Nam with the U. S. Public Health Service, in a hospital at either Da Nang or Nhatrang. He indicated that the duty will be for 12 to 14 months.

Dr. Robert Stiehl of Burke has announced that he will assume the Winner practice of Dr. Hayes.

* * *

Howard Dean Hughes, M.D., Clear Lake, South Dakota, has been elected to active membership in the American Academy of General Practice.

* * *

The newly completed hospital in Estelline, South Dakota, has been forced to close due to the inability to acquire a resident physician in the community. Drs. V. C. and Liselotte Marr, formerly of Estelline, have relocated in Cleveland, Ohio, where Dr. V. C. Marr plans to do cancer research.

* * *

Russell T. Orr, M.D., Sioux Falls, has been certified by the American Board of Obstetrics and Gynecology.

* * *

T. R. Jacobson, M.D., Hot Springs, attended a recent seminar conducted by the Federal Aviation Agency for advance aviation examiners.

Dr. Jacobson is the Federal Aviation Agency pilots' medical examiner in the Hot Springs area.

DR. ANNIS HONORS 10,000th N.A.R.I. MEMBER

Dr. Edward R. Annis, head of the Advisory Board of Trustees of the National Association of Residents and Interns, Inc., and immediate past president of the American Medical Association, presided at ceremonies recently honoring the 10,000th member to be admitted by the National Association of Residents and Interns, Inc.

Recipient of the honor was Ronald S. Wagner, M.D., an intern at the Albert Einstein Medical Center, Northern Division, in Philadelphia. Dr. Wagner received his medical degree from the University of Saskatchewan in Canada where he also studied as an undergraduate. He has stated that he plans to specialize in internal medicine.

* * *

DR. LAMPERT ON NATIONAL MEDICARE STUDY PANEL

Arthur A. Lampert, M.D., Rapid City, recently accepted an appointment to the committee of consultants of the Social Security Administration.

There are six advisory committees formed from industries which will be affected by the Medicare Act, such as hospitals, drug companies, the medical profession, insurance groups, etc. Each committee was involved in writing regulations and operational manuals for that part of the law which concerns them. These regulations were given to the Health Insurance Benefits Advisory Council which will give final passage.

"Sound, Simple Clinical Observation . . ."

I maintain that an experienced observer can tell whether a drug puts a patient to sleep, relieves pain, stops a cough, relieves an itch, lifts a depression or improves motility in arthritis without placebos and double-blind controls. Reciprocally, I have seen smart, young, relatively inexperienced investigators completely miss the obvious with their sophisticated technology. There is a place for sound, simple, clinical observation and I hope general practitioners will insist on having their data considered along with the other. I have an idea that they will be right as often as their younger instrumented, double-blind brethren. Theodore G. Klumpp, M.D., in **GP,** (32:203), November 1965.

* * *

THE BRIGHT FUTURE OF DRUG RESEARCH

Drugs of the future will be better tolerated by patients and will act with greater specificity. In the field of radiology, new agents will facilitate x-ray diagnostic procedures of the brain. Space medicine research promises to bring a beneficial fall-out of drugs for use in vestibular malfunctions, protection from harmful radiation, and reduction in fatigue. Other exotic areas of research may produce compounds that offer protection from extreme heat, and others from extreme cold. A pill that would repel insects is another possibility. The future of drug research was never brighter. The results will add to man's longevity, and will reduce the discomfort, suffering, and disability of disease. Austin Smith, M.D., in **Emory University Quarterly,** (21:141), Summer 1965.

* * *

THE QUEST FOR QUALITY IN DRUGS

As many studies show, all drug products having the same generic name are not identical. Some generic-name drug products are of excellent quality; some are not. Unless the product (whether marketed under generic or brand name) is made by a reputable and qualified manufacturer, there is absolutely no way to tell which is good and which poor — before it is used — without the use of analytical and biological facilities more elaborate than most physicians, pharmacists and hospitals are likely to possess. A. E. Slesser, Ph.D., in **Arizona Medicine,** (22:826), October 1965.



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You might also say that all interns aren't alike, either.





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JOURNAL OF MEDICINE

FEBRUARY • 1966

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**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **February, 1966** **Number 2**

CONTENTS

Meningococcal Infections, Fort Ord and California 15
John W. Brown, M.D. and Philip K. Condit, M.D.

The Management of Angina Pectoris 26
Mc K. Eugene McNabb, M.D. and James E. Doherty, M.D.

PathCAPsule — Urine Bacteriology 33

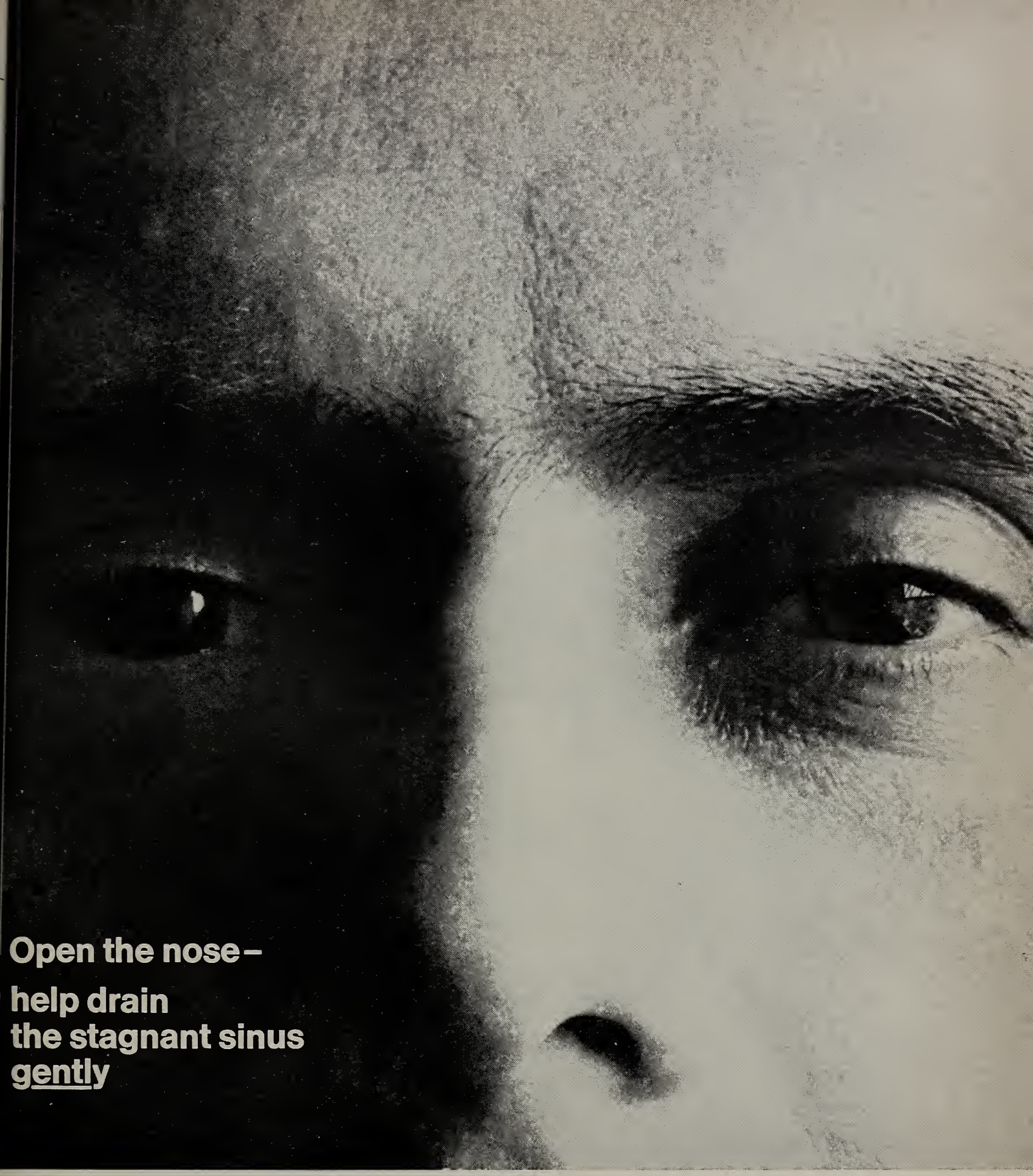
Congenital Granulocytic Leukemia in a Stillborn Infant 34
John F. Barlow, M.D., Sioux Falls, South Dakota

President's Page 38
Paul Hohm, M.D., Huron, S. Dak.

This Is Your Medical Association 39

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*Proctor, D. F.: The Nose, Paranasal Sinuses, and Ears in Childhood, Springfield, Ill., Charles C. Thomas, 1963, p. 34.

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MENINGOCOCCAL INFECTIONS, FORT ORD AND CALIFORNIA

By
John W. Brown, M.D.
and
Philip K. Condit, M.D.

In recent months considerable attention has been focused on the occurrence of meningococcal meningitis at Fort Ord, U. S. Army Training Center, Monterey County, California. This army post has had cases of meningitis at all seasons during the past three years, the greatest number of cases having occurred during the Summer and Fall of 1964. The continuous occurrence of new cases of meningitis at this training center over an extended period of time has created public awareness of the hazard of this disease and led to considerable publicity and consequent anxiety in the public mind.

The purpose of this report is to summarize the situation at Fort Ord with attention to its impact on the civilian population. The public news media have been assiduous in their coverage of the outbreak at Fort Ord. Epidemiologic Notes and California's Health, both publications of the California State Department of Public Health, have kept the local health officers aware of developments.[1, 2] This review includes the current reported incidence and recent trends in the occurrence of meningococcal meningitis for the State of California which is the background against which the Fort Ord outbreak should be considered. The results of laboratory studies are mentioned. Details of these will be reported elsewhere.

Fort Ord Cases, Military and Military Dependents

Table I suggests that the present cycle of increased incidence of meningococcal meningitis

Table I

Meningococcal Infections at Fort Ord
1960-1964 (thru Nov. 18)

Year	Combat Trainees			Military Dependents Meningitis		Total Meningococcal Infections
	Meningitis		Clinical Meningococcal Infections Without Meningitis			
	Cases	Deaths	Cases	Cases*	Deaths*	
1964 (thru Nov. 18)	89	12	4	10	2	103
1963	56	5	3	5	0	64
1962	36	0	0	2	0	38
1961	6	0	0	0	0	6
1960	2	0	0	0	0	2

*Includes 2 civilian cases (one fatal) who had close contact but were not dependents.

*Prepared by Bureau of Communicable Diseases

From the Division of Preventive Medical Services, California State Department of Public Health.
Dr. Brown is Public Health Medical Officer, Bureau of Communicable Diseases.
Dr. Condit is Chief, Bureau of Communicable Diseases, Berkeley, California.
Reprinted from California Medicine, Vol. 102, Page 171, March, 1965.

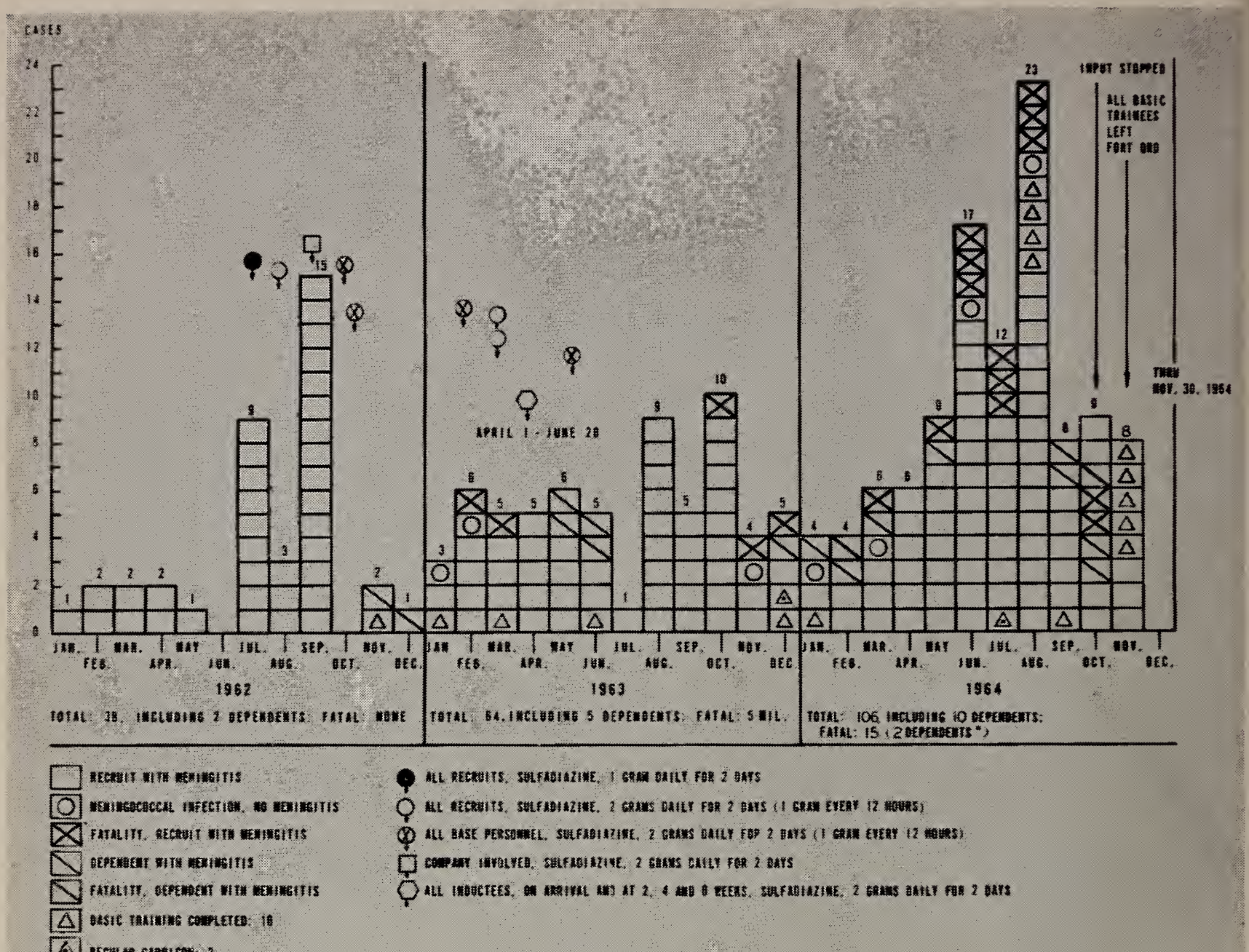


Figure 1. Meningococcal Infections. Cases and Deaths
Fort Ord, California, January, 1962 — November 30, 1964

at Fort Ord began between 1961-1962. There were 2 and 6 cases in 1960 and 1961 respectively. A significant increase to 38 cases occurred in 1962. Figure 1 shows the number of cases by months. It also indicates illness in basic trainees, other military personnel, civilian military dependents, those cases which were fatal and those with meningococcal infections without meningitis or meningococcemia. Fatalities first occurred in 1963 with a further increase in 1964. Table II shows the case rate per 100,000 total population each year from 1959-1964 by geographic area within the State of California. Most areas show a moderate or slight increase in case rate. The Central Coast, which includes Monterey and Fort Ord, shows a marked increase.

Most of the cases of meningitis at Fort Ord have occurred in basic trainees in the first 8 weeks of training. During 1963 and 1964 there was an increase in meningitis among those who had recently completed basic training. There were only 2 cases in men of the regular garrison. (Figure 1.) Nor was there meningitis in cadremen who were the instructors and otherwise helped in basic training. These men have close daily contact with the trainees and occupy the same barracks. None of the officers, including line commanders, physicians, dentists and nurses developed a meningococcal infection. The officers had individual quarters and the cadremen had space separate from the trainees but in the same barracks.

The peak number of cases in a single month occurred in August 1964, but the outbreak continues to the present with 9 cases in October and 8 in November. Five of 8 cases in trainees during November were among those who had completed basic training. All basic trainees had left Fort Ord by the end of November. For October, 3 dependent cases are shown. One of these is a civilian military dependent cared for

Table II

Meningococcic Meningitis Cases and Rates/100,000
By Area, California, 1959, January 1-November 30, 1964

AREA	1959		1960		1961		1962		1963		1964	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Central Coast (Includes Monterey County and Fort Ord)	6	1.6	6	1.6	20	5.2	46	11.5	55	13.3	103	23.8
Los Angeles	60	0.9	64	0.9	75	1.1	124	1.7	125	1.7	158	2.0
Mountain	1	0.3	8	2.6	3	1.0	1	0.3	2	0.6	5	1.5
North Coast	7	3.8	8	4.3	9	4.8	6	3.1	3	1.6	12	6.2
Sacramento Valley	9	1.2	12	1.5	8	1.0	17	2.0	12	1.3	14	1.5
San Diego	21	2.1	23	2.1	26	2.4	33	2.9	51	4.4	38	3.3
San Francisco Bay	41	1.2	46	1.3	63	1.7	63	1.6	93	2.3	108	2.6
San Joaquin Valley	19	1.4	24	1.7	21	1.4	26	1.7	23	1.5	36	2.3
South Central	6	1.8	3	0.8	1	0.2	7	1.6	12	2.5	8	1.6
Southeast	20	2.3	15	1.7	10	1.1	11	1.1	11	1.1	14	1.3
Total State	190	1.2	209	1.3	236	1.4	334	2.0	388	2.2	496	2.7

on the post. The other two civilians were not near the post but had close contact with a healthy carrier from a basic training brigade at Fort Ord. One died. There are other instances of individual civilians with meningococcal meningitis wherein indirect contact with the post could be traced but which are not listed because of the nature of the exposure and the multiple other opportunities for contact with meningococci elsewhere.

Clinical Features

The Fort Ord outbreak has been attended by several fulminating cases of meningococcemia, with shock and a confluent hemorrhagic eruption. The interval between the onset of illness and death has been as short as 5 hours, beginning with malaise, sore throat, slight headache, one or two petechiae a little later, to the state of collapse with widespread confluent hemorrhages in the skin a few hours after the first petechiae appeared. Most of the fatalities are in this group. The measures taken at the post to insure early diagnosis and early treatment no doubt have been important factors in the overall relatively favorable case fatality rate.

The case fatality rate for the 3 years was: 1962, 0%; 1963, 8.2%, and 1964, to December 1st, 13.3%. During the same period the fatality rate for the State as a whole was: 19.1% and 19.1% for 1962 and 1963. (Fig. 3, Table III). The Fort Ord fatality rate includes the occasional recruit who developed meningitis while on furlough after finishing basic training and was hospitalized elsewhere. Often treatment was received at a later stage of the disease in such cases. Some of these were fatal. But every patient connected with trainees at or recently from Fort Ord is listed in the totals.

During 1964 there were 10 patients classified as military dependents. Two of these died. In several instances the contacts had throat cultures and the meningococci which were isolated were characterized. None of the cases in de-

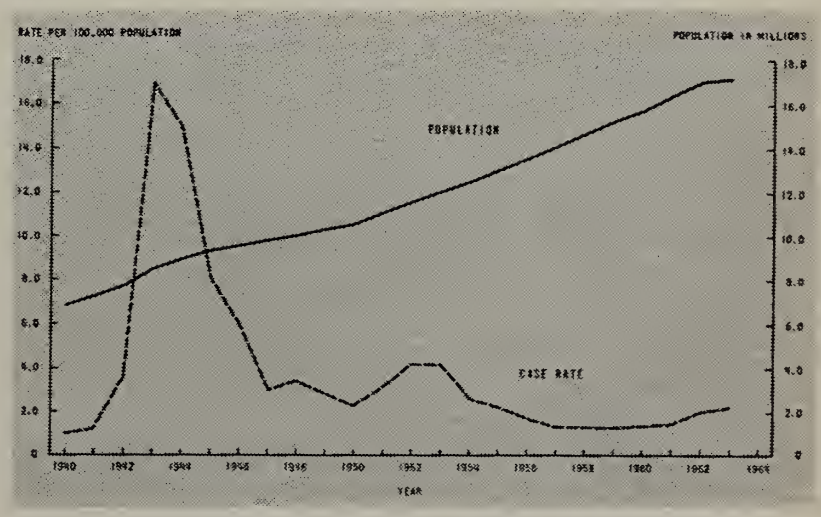


Figure 2. Meningococcal Meningitis in California 1940-1963

Table III

Meningococcal Infections, Cases, Deaths and Rates
State of California
1913 1964 (Through November)

Year	No. of Cases	Rate per 100,000	No. of Deaths	Case Fatality Rate (Percent)	Year	No. of Cases	Case Rate per 100,000	No. of Deaths	Case Fatality Rate %
1913	67	2.4	49	73.1	1938	113	1.7	42	37.2
1914	70	2.4	38	54.3	1939	84	1.2	29	34.5
1915	46	1.5	22	47.8	1940	68	1.0	17	25.0
1916	64	2.1	15	23.4	1941	87	1.2	22	25.3
1917	133	4.2	31	23.3	1942	277	3.6	70	25.3
1918	226	6.9	—	—	1943	1441	16.9	189	13.1
1919	103	3.1	77	74.7	1944	1344	15.0	154	11.5
1920	183	5.2	55	29.6	1945	759	8.1	126	16.6
1921	176	4.6	63	35.8	1946	550	5.9	91	16.5
1922	124	3.1	41	33.0	1947	291	3.0	66	22.7
1923	135	3.2	47	34.8	1948	344	3.4	62	18.0
1924	127	2.8	40	31.4	1949	288	2.8	61	21.2
1925	122	2.6	39	31.9	1950	247	2.3	35	14.2
1926	208	4.2	102	49.0	1951	342	3.0	66	19.3
1927	260	5.1	101	38.8	1952	483	4.2	87	18.0
1928	260	4.9	115	44.2	1953	501	4.1	107	21.4
1929	738	13.3	381	51.6	1954	328	2.6	69	21.0
1930	336	5.9	167	49.7	1955	291	2.2	50	17.2
1931	261	4.5	152	58.2	1956	236	1.7	50	21.2
1932	166	2.8	86	51.8	1957	197	1.4	62	31.4
1933	141	2.4	77	54.6	1958	196	1.3	42	21.9
1934	100	1.7	49	49.0	1959	190	1.2	36	16.4
1935	275	4.5	124	45.0	1960	209	1.3	42	20.1
1936	299	4.7	127	42.5	1961	236	1.4	50	21.2
1937	245	3.8	102	41.6	1962	334	2.0	64	19.1
					1963	388	2.2	72	19.1
					1964*	496	2.7	51**	

*Through November 30
**Data from death certificates, figures available through June, 1964

pendents had contact with a patient with meningitis. A typical example was the occurrence of meningitis in a 3½ year old child of a member of the permanent garrison. Cultures revealed that the mother was the carrier of the Type B strain of meningococcus similar to that of the child. The single culture of the father failed to reveal the organism.

For the treatment of cases the soluble salt of penicillin G, given intramuscularly in divided doses of about 2 million units every 2-3 hours, or approximately 24 million units in 24 hours, seems to have been the most successful therapeutic measure. The most difficult current problem relates to the management of carriers and contacts by chemoprophylaxis.

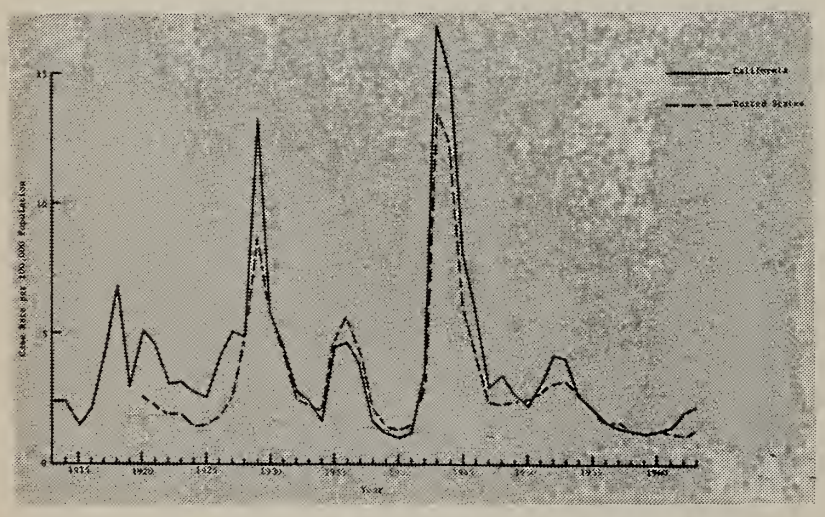


Figure 3. Case Rate of Meningococcal Meningitis California and United States, 1913-1963

Communicability

The Fort Ord outbreak demonstrates again that meningococcic meningitis is of low communicability. Under ordinary circumstances the risk of acquiring this disease is minimal. It is obviously low even at Fort Ord. It is evident that there were literally thousands of contacts and opportunities for transfer of meningococci between individuals, both civilian and military, at Fort Ord. Yet there have been comparatively few cases of meningitis considering the high percentage of personnel whose throat culture was positive for serotype B meningococci. A tragic episode took place in October, 1964. A basic trainee on leave spent a day and evening with his fiancee. After his return to Fort Ord the girl developed fulminating meningococcal

Table IV

Meningococcal Infections
Total California population and civilian population of Monterey County

Year	California		Monterey County (Exclusive of Fort Ord)	
	Cases	Deaths	Cases	Deaths
1964	496 (Jan.-Nov.)	51 (Jan.-June)	1 (Jan.-Sept.)	0 (Jan.-Sept.)
1963	388	72	16	2
1962	334	64	7	0
1961	236	50	10	0
1960	209	42	3	0

Table V

Civilian Cases of Meningococcal Meningitis with no Known Contact to Military Personnel, California and Selected Health Jurisdictions
January 1-September 26, 1964*

Area	Total Cases	Cases with no known contact	
		Number	Percent
California	269	229	85.1
Los Angeles County	59	57	96.6
San Francisco	16	15	93.8
San Bernardino	9	8	88.9
Santa Clara	15	10	66.7
Contra Costa	8	5	62.5

*41 Counties reporting representing 85% of California population (15.4M)

meningitis and died. The trainee remained well. Type B meningococci were obtained by culture of both the man and his fiancee. The connection with the outbreak at Fort Ord seemed clear and received considerable attention by the press and public. Anxieties already present were heightened. Only recently has it been shown that the meningococcus of the soldier and that of the girl were probably different strains. She most likely acquired the organism which caused her death from some other unknown person, a tragic coincidence.

A survey of Monterey County in which Fort Ord is located revealed only one case of meningococcal meningitis in the civilian population for the period Jan.-Sept. 1964. Table IV. Table V covers the same period for most of the State and illustrates the civilian patients of meningococcal meningitis for whom no known contact with military personnel had preceded the disease. The percent without contact with military personnel previous to illness varied from county to county. For the State, 85% of all civilian cases of meningococcal meningitis during the period indicated denied contact with military personnel.

The age distribution shown in Table VI is significant with reference to communicability. During 1964, through September 26, 56% of the cases of meningococcic meningitis in civilians in California occurred in children 4 years of age or younger. Of the total 74% were under 15 years of age. There is little doubt but that children are the most susceptible to this disease.[4, 5, 6] This is supported by the data for age distribution during 1961, 1962 and 1963. (Table VI)[5, 6]

The Meningococci

All of the strains of **Neisseria meningitidis** which have caused meningitis at Fort Ord since 1962 were either serotype B or C, 90% being Type B. This is also true for civilian cases in California. Throat culture surveys in both military and civilian groups have revealed Type A very rarely. Prior to 1962, Type A meningococci predominated during outbreaks, with Types B and C being found only occasionally in sporadic cases.[4, 5]

Resistance to Antimicrobial Agents

By "resistant" is meant that the strain of meningococcus will grow in media containing 0.1 mg. of sulfadiazine/100 cc. It has been determined that this is the critical level insofar as sulfadiazine prophylaxis for the eradication of organisms from the nasopharynx of carriers is concerned utilizing the standard prophylactic dose of sulfadiazine. When significant numbers of strains are resistant to this dose, its use for chemoprophylaxis in an outbreak situation will

Table VI

Age Distribution of Civilian Cases of Meningococcal Meningitis, California — 1961, 1962, 1963, 1964

Cases	Total	AGE Under 1	1-4	5-9	10-14	15-19	20-24	25-34	35-44	45-64	65+	Not Dated
						1961						
Number	236	50	84	30	15	13	9	12	2	16	4	1
Percent	100.0	21.2	35.6	12.7	6.4	5.5	3.8	5.1	0.8	6.8	1.7	0.4
						1962						
Number	334	77	84	29	13	52	42	6	7	17	7	
Percent	100.0	23.1	25.1	8.7	3.9	15.6	12.6	1.8	2.1	5.1	2.1	
						1963						
Number	388	88	120	28	15	39	31	12	11	16	5	23
Percent	100.0	22.7	30.9	7.2	3.9	10.1	8.0	3.1	2.8	4.1	1.3	5.9

1964 (Through September 26) 41 Counties Reporting*

Cases	Total	AGE Under 1	1-4	5-9	10-14	15-19	20-24	25-29	30-39	40-49	50-59	60+
Number	269	44	107	28	20	22	13	1	10	14	5	5
Percent	100.0	16.4	39.8	10.4	7.4	8.2	4.8	0.4	3.7	5.2	1.9	1.9

*41 Counties reporting representing 85% of California population

be unsatisfactory.[8] The result of its use under these circumstances has been increased resistance or increase in the number of strains which are resistant. Although blood levels in patients are much higher than 0.1 mg/100 cc during therapy, sulfadiazine does not act effectively when resistant strains as defined are the cause of meningitis. Table III provides data which shows the influence of sulfonamides on case fatality rates over the years. A beginning improvement in the case fatality rate is evident from 1938 and 1939 on with the most pronounced improvement beginning in 1943. Sulfanilamide became available on the West Coast about 1937, sulfadiazine by 1941. During 1938 and 1939 sulfapyridine and sulfathiazole respectively were introduced and shown to be effective against the meningococcus. However, sulfadiazine became the drug of choice and continued to be so until 1962 for both treatment of cases and for mass chemoprophylaxis in outbreaks. No strain of meningococcus was reported to be resistant to sulfadiazine until the outbreak of meningitis at the San Diego Naval Training Center in 1962. Several strains in that outbreak were found and characterized which were very resistant to sulfadiazine. Since then numerous resistant strains have been isolated from both civilians and military personnel. Meningococci have retained unchanged their sensitivity to penicillin, tetracycline, chloramphenicol and most broad spectrum antimicrobials. This is fortunate for treatment but none of these agents has been shown to be effective for mass prophylaxis of carriers in doses less than the full therapeutic amounts.

Drug Prophylaxis

During 1962 and 1963 mass chemoprophylaxis with sulfadiazine was carried out on 9 occasions at Fort Ord. Doses of 2 and 4 grams were used at different times. In the Fall of 1962 the case rate diminished following administration of sulfadiazine to all base personnel. When this was repeated in 1963 drug prophylaxis was ineffective and new cases continued to occur (Figure 1). Mass chemotherapy as a control measure was discontinued after June 28, 1963. It was the opinion of the Committee on Meningococcal Meningitis of the Armed Forces Epi-

Table VII

Results of Serotyping and Sulfonamide Sensitivity Testing of 91 Strains of Meningococci from all Parts of California

	Number of strains of Meningococci					
	Total Examined	No. Type A	No. Type B	No. Type C	Percent Type B	Percent Type C
Total	91*	1	72	16	79%	17%
Number Resistant to Sulfa	31	0	30	1		
Percent Resistant	36%	0	42%	6.2%		
Number Sensitive to Sulfa	66	1	42	14		
Percent Sensitive to Sulfa	64%**		62.5%	94%		

*2 strains were too rough to type
**A strain of type B was not tested

By the Microbiology Laboratory, California State Department of Public Health, in collaboration with the Communicable Disease Center, Atlanta, Georgia.

demiological Board that there is sufficient evidence available to state that no known single antimicrobial agent or combination of agents currently available is satisfactory for mass prophylaxis of contacts or the treatment of carriers in outbreak situations due to sulfonamide resistant meningococci. The continued routine use of sulfonamide prophylaxis for meningococcal infections at Fort Ord was not recommended. The Committee stated that sulfadiazine prophylaxis according to previously accepted dosage schedules should be utilized in outbreak situations only after laboratory studies have established that the organism is sensitive to this drug.

A rationale exists for the use of sulfadiazine prophylactically for prevention of meningococcal meningitis in contacts of sporadic civilian cases of the disease. To date two-thirds of these cases have been due to sulfonamide sensitive organisms.

Incidence of Carriers

Surveys were made during 1964 by the Sixth Army Laboratory on groups of men reporting to the Armed Forces Recruitment Center in Oakland, California, for preinduction physical examinations. These men, still in civilian clothes, had no prior opportunity for contact with army personnel. New trainees at Fort Ord had throat cultures immediately on arrival. A group of about 30 men have had a culture each day at the post over a one month period. Others had serial cultures at weekly intervals. Platoons within companies and battalions had throat cultures. Several hundred University of California students had throat cultures taken by the Microbiology Laboratory of the State Department of Public Health during one day as a further control on the carrier rate in civilian groups in ages 17-24. Serotyping was done on all meningococci isolated and sulfonamide sensitivity determined on each strain.

The carrier rate for meningococci among the groups noted averaged 20% on first culture, with a range of 9.4 to 25%. This is believed to reflect the current carrier rate in the young adult male civilian population in California. During basic training the carrier rate may reach 70 to 90% by the eighth week. However, no correlation has been apparent between the carrier rate and the occurrence of cases of meningitis between different barracks. The carrier state in an individual may be transient, in that a man may show the organism on culture of his throat on one day and not the next, or vice versa. Over 90% will have meningococci one or more times if a series of daily cultures are made.

Most of the strains isolated from the civilians were sulfonamide sensitive (Table VII). Those cultures obtained from trainees, cadremen and personnel generally on the Army Post showed the isolates to be more frequently resistant to sulfadiazine than those from the civilian population. This was variable between companies.

Table VIII

MENINGOCOCCAL MENINGITIS CASES BY AREA[1]
CALIFORNIA, JANUARY-NOVEMBER, 1964

AREA, COUNTY AND HEALTH JURISDICTION	CASES			AREA, COUNTY AND HEALTH JURISDICTION	CASES		
	Total	Civilian	Military[2]		Total	Civilian	Military[2]
California	496	380	116	Central Coast	103	8	95
				Monterey	96	1	95
North Coast	12	12	—	San Luis Obispo	3	3	—
Humboldt-Del Norte	5	5	—	Santa Cruz	4	4	—
Lake	1	1	—				
Mendocino	6	6	—	San Joaquin Valley	36	36	—
				Fresno	11	11	—
Sacramento Valley	14	14	—	Kern	6	6	—
Sacramento	7	7	—	Kings	4	4	—
Sutter	1	1	—	Merced	2	2	—
Tehama	1	1	—	San Joaquin	5	5	—
Yolo	4	4	—	Stanislaus	2	2	—
Yuba	1	1	—	Tulare	6	6	—
Mountain	5	5	—	South Central Coast	8	8	—
El Dorado	1	1	—	Santa Barbara County	2	2	—
Nevada	2	2	—	Ventura	6	6	—
Shasta	2	2	—				
				Los Angeles Metropolitan	158	157	1
San Francisco Bay	108	107	1	Los Angeles County	140	139	1
Alameda County	26	26	—	Orange	18	18	—
Contra Costa	13	12	1				
Marin	2	2	—	San Diego	38	19	19
San Francisco	23	23	—	San Diego	38	19	19
San Mateo	11	11	—				
Santa Clara County	30	30	—	Southeast	14	14	—
Solano	3	3	—	Riverside	3	3	—
				San Bernardino	11	11	—

[1] Counties are listed only if cases were reported.
[2] Figures are those reported by health jurisdictions and may differ from military reports.

Source: California State Department of Public Health, Morbidity Records.

The meningococci isolated from clinical cases of meningitis at Fort Ord showed approximately 50% of the strains to be resistant to sulfadiazine. The isolates were all group B or C.

Civilian Population

Examination of 91 strains of meningococci from patients with meningitis located in all parts of the State began on April 1, 1964, in collaboration with CDC, Atlanta, Georgia. Of these serotype A was found only once. Table VII indicates that it is the type B which is most often resistant to sulfadiazine. Only two of sixteen Type C strains obtained were resistant. Sixty-three percent of the Type B strains were sensitive to sulfadiazine.

The rapid population growth in California and the case rate per 100,000 population are noted in Figure 2. The death rates and case rates for California since 1913 are shown in Table III. The number of cases and deaths are also given. The last peak in the cyclical occurrence of meningococcal meningitis was in 1953 with 501 cases and a rate per 100,000 of 4.1. There were 5,077 cases reported for the entire United States, a rate of 3.2 per 100,000 population. Then the number of cases declined each year to the low in 1959 when 190 cases were reported in California and 2,180 for the United States, case rates of 1.2 and 1.2 respectively. Since 1959 there has been a slow and gradual increase in the number of cases. In 1963, 388 cases were reported for the State, a case rate of 2.2.

To December, 1964, 496 cases have been reported in California or 2.7 per 100,000 population (Table VIII). The rates for the United States as a whole for 1963 and the first 10½ months of 1964 were 1.1 and 1.2 respectively. Figure 3 compares the case rates of the United States and California. Figure 4 shows the incidence of meningococcal infection by area throughout the United States. Every region except New Eng-

land shows a beginning rise in incidence. California shows a sharp increase.

Precautions Instituted at Fort Ord

A. Presently in effect

1. The input of new basic combat trainees and of Army Reserve personnel to Fort Ord has been discontinued temporarily. There were no basic trainees at this Post as of December 1, 1964. It is planned to permit one or two months to elapse before training is resumed. This applies only to men in their first 8 weeks of training and to Army Reservists.
2. When training is resumed all of the precautions which were in effect when the input of trainees was stopped will be reinstituted.
3. When training is resumed visitors to trainees will be limited to parents while the trainee is in residence at Fort Ord.
4. Upon completing the 8 weeks of basic training trainees will be transferred immediately to their next duty assignment without a leave or pass at this time.

B. Preventive measures initiated by order dated August 4, 1964, and subsequent orders.

These precautionary measures are for the purpose of preventing indiscriminate intermixing of many groups of trainees:

1. The reception procedure was changed so that all men were assigned to a platoon as soon as they arrived at the Post. The individual remains with the same trainees throughout the roughly 72 hours of reception procedures and he remains in his assigned platoon for the 8 weeks of basic training. The "buddy platoon" method is employed in which only two platoons of a company are allowed to mix freely.
2. Leaves or passes were cancelled for the duration of the eight-week training period.
3. The trainees were not allowed to leave their company area or to go to other company areas or to the Post Exchange, the theatre or chapel. Religious services, movies, and Post Exchange services were brought to the companies individually and provided out of doors.

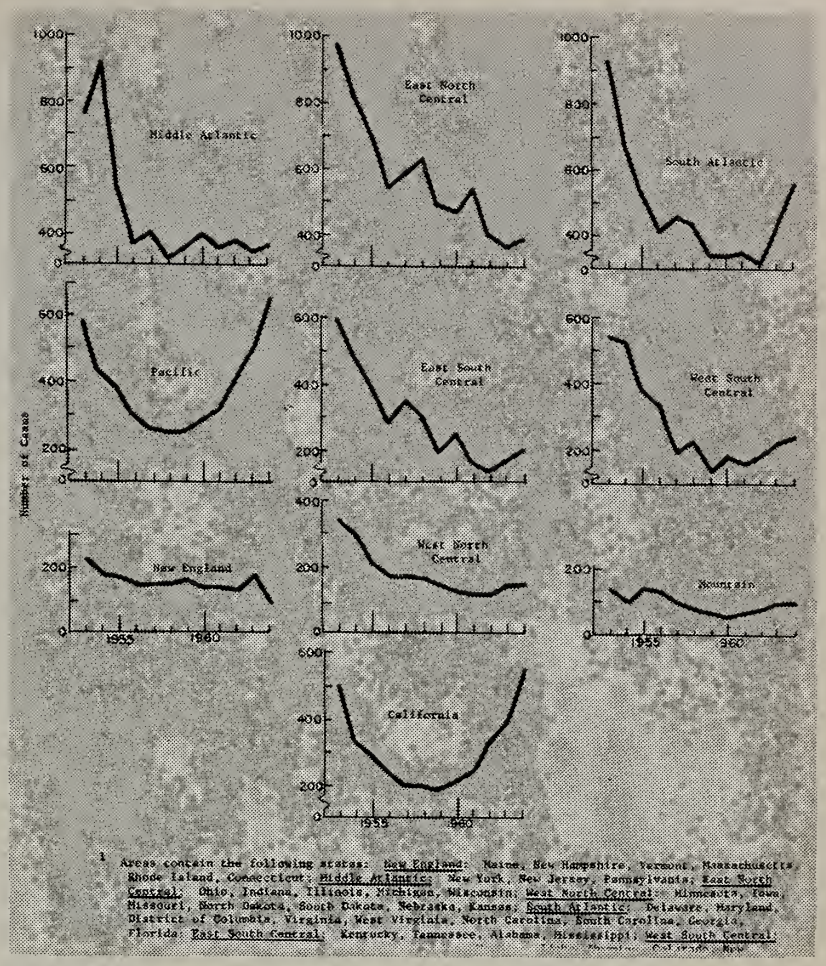


Figure 4. Cases of Meningococcal Meningitis California and Each Area[1] of United States 1953-1964.

4. For classroom work the classes were divided to provide a vacant seat between each man.
5. Additional barracks were provided to make possible an interval of two weeks between the evacuation of the barracks by one group on completion of training and the refill of these barracks by newly arrived trainees. This prevented the so-called "Back-to-back" filling of barracks and provided a two week free period for the cadremen who live with the recruits. They are assigned to other duties when their company area has been evacuated.
6. The input of new trainees was reduced to 800 per week during September and was projected at 700 a week or less during October. This compares to a weekly input of 1000 or 1200 or more men up until the end of August.

C. **Other preventive measures**

1. A system of close surveillance of recruit personnel was instituted.
   Any trainees showing indication of a respiratory infection, headache or other minor symptoms which might suggest impending meningococcal infection were

hospitalized on suspicion for a 48 hour period of observation. This step was important for early recognition. Early diagnosis and treatment seems to have been a most important factor for the success of treatment.

2. Physical conditioning activities were lightened to limit the chance of overfatigue.

Living conditions for the troops appear to be excellent and to maintain the principle of limited intermixing. The barracks, kitchens and utilities are scrupulously clean. The men have a full 72 sq. ft. of space each. However, the double decker bunk system is still used.

Expert consultants, civilian and military, have come to Fort Ord to consider the problem of meningococcal meningitis and its prevention there. A team from the Walter Reed Army Institute of Research (WRAIR) made throat culture surveys on several occasions during the past two years. The Committee on Meningococcal Meningitis of the Armed Forces Epidemiological Board spent 2 days at Fort Ord during September, 1964, for a review of the meningitis problem.

Headquarters, Sixth Army maintains a day to day surveillance and the Sixth Army Laboratory has developed the capability for comprehensive studies.

The California State Department of Public Health has close liaison with officials at Fort Ord and Sixth Army Headquarters. The Post was visited each week for several weeks. The Microbiology Laboratory of the State Health Department collaborated in making throat cultures.

DISCUSSION

The natural habitat of **Neisseria meningitidis** is the nasopharynx of human beings.[3, 4] The results of studies in progress suggest that nearly all people have the organism in their nasopharynx at some time or other, if not continuously. The dispersal of the organism throughout a population, civilian or military, is apparently very rapid. However, there must be several thousands of carriers of the organism for every case of meningococcal meningitis. No other animal has been shown to act as either reservoir or vector in the transmission of this organism.[4] Also not involved are fomites, such as soiled linen, blankets and mattresses used by former patients or carriers.

There are currently about 20% carriers of Type B meningococci in the 17-24 year old male civilian population. It is not necessary to postulate exposure to military personnel in order to have contact with meningococci. The organism is so widely disseminated throughout the population that it is impossible to decide with certainty the source of the organism infecting any given individual. Multiple opportunities for exposure are constantly present. This is a finding which has been emphasized and extended by studies associated with the episode at Fort Ord. Further studies will indicate whether the carrier rate remains high throughout the year.

It is doubtful if military groups pose any greater hazard to the civilian population than that encountered by civilian groups in their daily exposure to carriers in the civilian population. The occurrence of cases must be the result of a failure on the part of the host to resist invasion. It is the concensus that those who harbor the organism are less likely to develop meningitis than those who do not. A resistance is acquired, the duration of which remains to be clarified. These are aspects of the problem which bear on the effectiveness of a vaccine.

An analysis of cyclical trends in the occurrence of meningococcal meningitis in California since 1918 indicates that this disease occurs in irregular cycles which average 9 years in duration. It is probable that the present upward cycle may continue for another two years.

SUMMARY

The outbreak of meningococcal meningitis which began at Fort Ord in 1962 and is still continuing toward the end of 1964 is described. Some of the many factors which have a bearing on the epidemiology and pathogenesis are noted. It appears that California is in the vanguard of a cyclical upswing of the disease and that other areas in the United States will soon follow. In most States a slight upswing in incidence has already begun.

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Resume of Paper: Meningococcal Meningitis, Fort Ord and California, by John W. Brown, M.D. and Philip K. Condit, M.D.

Meningococcal meningitis began to occur in outbreak proportions during 1962 at Fort Ord, Monterey County, California. This increase in incidence of the disease continued throughout all seasons until November 1964 when basic training was stopped at that post. Most of the cases were among basic trainees in the first 8 weeks of training. The disease occurred only twice in men of the regular garrison. Nor was there meningitis in instructors, line commanders, doctors, nurses, dentists or cadremen. All of these groups had close contacts with basic trainees and the cadremen occupied the same barracks.

All of the meningococci isolated were serotype B and about 50% of the military cases with meningitis had sulfadiazine resistant strains. At this time, approximately 20% of the civilian male population of military age are carriers of the organism before going into service. By 8 weeks of training nearly 90% of the men in some barracks had the organism. Yet there is no correlation between the carrier rate and the occurrence of cases between barracks. Sulfadiazine prophylaxis failed to stop the outbreak of meningococcal meningitis. There is reason to avoid mass prophylaxis with sulfadiazine or penicillin in the doses ordinarily employed.

A feature of this outbreak is the finding of such a high percent (20%) of healthy males who are carriers of type B meningococci. This finding reflects the carrier rate in the general civilian population of the same age. Multiple opportunities for exposure are constantly present. The organism is apparently so widely disseminated throughout the population that it is impossible to decide with certainty where the source was of the organism infecting any particular person. It is unlikely that military groups pose any greater hazard to the civilians than that they each encounter every day. During 1964, only one instance of meningococcal meningitis was found among the civilians of Monterey County, while there were 89 in military personnel and 10 among the civilian dependents of military personnel.

At present there is an increasing rate of meningococcal meningitis among the total population of California suggesting that this area is on the upward swing of a cycle in the cyclical occurrence of the disease. Such cycles have been observed approximately every 8 to 12 years in the past.

Headlines Can Be Harmful

Irresponsible scare reporting of drug reactions has led to more than a score of similar near-tragedies in my own psychiatric practice. The course of treatment of many patients has been prolonged by articles that shock rather than inform. Needless anxiety has been heaped on top of a pre-existing emotional disturbance by such a headline as this: "A fatal reaction to frequently used drug — tranquilizer found to be dangerous." More than one frantic midnight call has come to me from patients who discovered to their horror that the drug they were taking — and that had been helping them for weeks or months — is, according to their local newspaper, a "killer." — Elliott N. Wineburg, M.D. in **Medical Economics,** (42:160), December 13, 1965.

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THE MANAGEMENT OF ANGINA PECTORIS*

Mc K. Eugene McNabb, M.D. and James E. Doherty, M.D.

The major manifestations of atherosclerotic coronary artery disease or arteriosclerotic heart disease include:

1. The anginal syndrome (angina pectoris). This is characteristically described as retrosternal or precordial discomfort or pain occurring with exertion, sometimes radiating to the arms or neck, relieved by rest and/or nitroglycerin. The electrocardiogram may be normal except during an episode of pain.

2. The intermediate syndrome (angina decubitus, status anginosus). Described as an "intermediate" state between angina pectoris and infarction. Pain occurs at rest, often of long duration and is inconsistently relieved by nitroglycerin; often requiring narcotics. The electrocardiogram does not show findings indicative of myocardial infarction, either transmural or nontransmural, but is often abnormal.

3. Myocardial infarction. The familiar "heart attack" characterized by severe, prolonged pain as described above, requiring narcotics for relief with electrocardiographic or other signs of tissue necrosis.

This discussion is concerned with the first of these symptoms, namely, angina pectoris, a troublesome manifestation of a serious disease.

General Measures

In approaching the management of patients with angina pectoris, ruling out those diseases which aggravate the condition should be automatic. Occasionally this will require more than the routine laboratory tests. Identification of a coexisting aggravating disease and its proper treatment may dispel the need for more than minimal treatment of the angina itself. Diseases known to increase anginal attacks include polycythemia, hypoglycemia, thyrotoxicosis, hypertension, cardiac arrhythmias, such as bigeminy or any type of tachycardia, anemia, and congestive heart failure. Some of these may insidiously affect the patient's course and should be searched for in individuals with changing complaints or "treatment failures." Any overt disease in some measure may add to the burden of the heart and merits attention. Several disorders are recognized as occasionally complicating angina pectoris, even if by an indirect route. Hiatal hernias, chronic gall bladder disease, peptic ulcers and musculo-skeletal disturbances about the chest and arms, when corrected may considerably minimize what formerly seemed a real problem in cardiac therapy. The pressure pain of the overdistended urinary bladder should not be overlooked as an aggravating factor.

Much can be done for the angina patient besides the employment of drugs. Patients should be counseled against pain-precipitating, unnecessary bursts of physical activity and taught to stop short of actually experiencing angina. Stress should be made on the point that most things can be accomplished if performed slowly enough. A patient should be instructed to regulate each day's work load so that his accumulated fatigue does not result in anginal pain in the evening. Patients often superimpose an acute stress to the heart on a cumulative end-of-the-day fatigue (sexual intercourse is an example). A simple rearrangement of living habits can avoid jeopardizing the heart. Mild, regular exercise for the idle, sedentary patient is not contraindicated and may be beneficial. Some authors point to the effect of exercise in increasing coronary flow. For mild exercise this augmented flow is disproportionately greater than the myocardial work burden produced by the exercise. This can result in some degree of prophylaxis against angina.

A patient should be enlightened as to the effect of cold, in several different forms, on his condition. Even cold drinks or touching cold objects with the hands in addition to cold wind, cold baths, cold beds and bedrooms and general body chilling may trigger attacks. Wintertime may double the heart's difficulties in that the patient

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faces colder temperatures with the added weight of extra clothing. Some patients inadvertently perform errands in the colder early morning hours that could well be left to the middle of the day and done without pain. Retiring at night to an unheated bedroom, changing into cold pajamas, and assuming the recumbent position on cold sheets may initiate angina. Pre-warming the bedroom and the pajamas and sitting on the bed with a robe over the pajamas a few minutes before lying may enable the patient to avoid an attack. Electric blankets adjusted each night prior to entering the bed are helpful to some cardiac patients. Covering the mouth with a scarf while walking in the winter air may help prevent chest pain.

The idea that the individual can alleviate his heart burden and diminish the occurrence of pain by reducing excess body weight is a stronger stimulus than most incentives for weight reduction and should be exploited fully by the physician.

The act of eating and the process of digestion have certain hazards. Extra large meals should always be avoided because of the increased work load placed on the heart to step up blood flow to the gastrointestinal tract. Four small meals a day would be better than two or three in many patients. Armchair rest and relaxation for thirty minutes or more after each meal may make quite a difference in the course of some. Caution should be urged against physical exertion in the post-prandial period.

The part emotions play in the production of chest pain impresses many patients more than that related to exertion. Some patients learn on their own a form of "walk away therapy" in which emotion-laden situations are spotted in advance and avoided by the patient. Athletic events notoriously precipitate angina. The weight of the physician's advice may need to be brought to bear on those patients who take increased risks to attend sports events. Television or radio may also be found to be quite stressful. There are individuals who know that certain weekly television shows can produce angina with "clock-like" regularity. Guarding against overindulgence in emotionally charged "entertainment" can smooth the course of the troubled angina patient.

The role of the patient's job in the aggravation of his disease should be of interest to the physician. Frequently he has to decide whether or not the burden on the patient's emotional and physical energies is too great. The factor of occupational stress may be seen in an illustration close to home. In a study conducted on heart disease in American physicians, the prevalence of coronary artery disease in four doctor groups ranked as follows:

General practitioners
Anesthesiologists
Pathologists
Dermatologists

General practitioners had a prevalence rate approaching two times that of non-medical population groups and three times that of dermatologists and pathologists. Anesthesiologists had a prevalence rate of two times that of the other two specialty groups mentioned. Hopefully, the working duties of the angina patient may be modified to allow pursuit of an occupation relatively free of the former pain-producing stresses.

The use of nicotine is not advised in any person with a circulatory disorder. One cigarette can provoke an anginal episode in susceptible individuals. The problem of smoking, however, cannot be dealt with too rigidly because most patients will be relatively less sensitive to circulatory ill effects of nicotine and may be compromised by the anxiety induced by withdrawal from smoking.

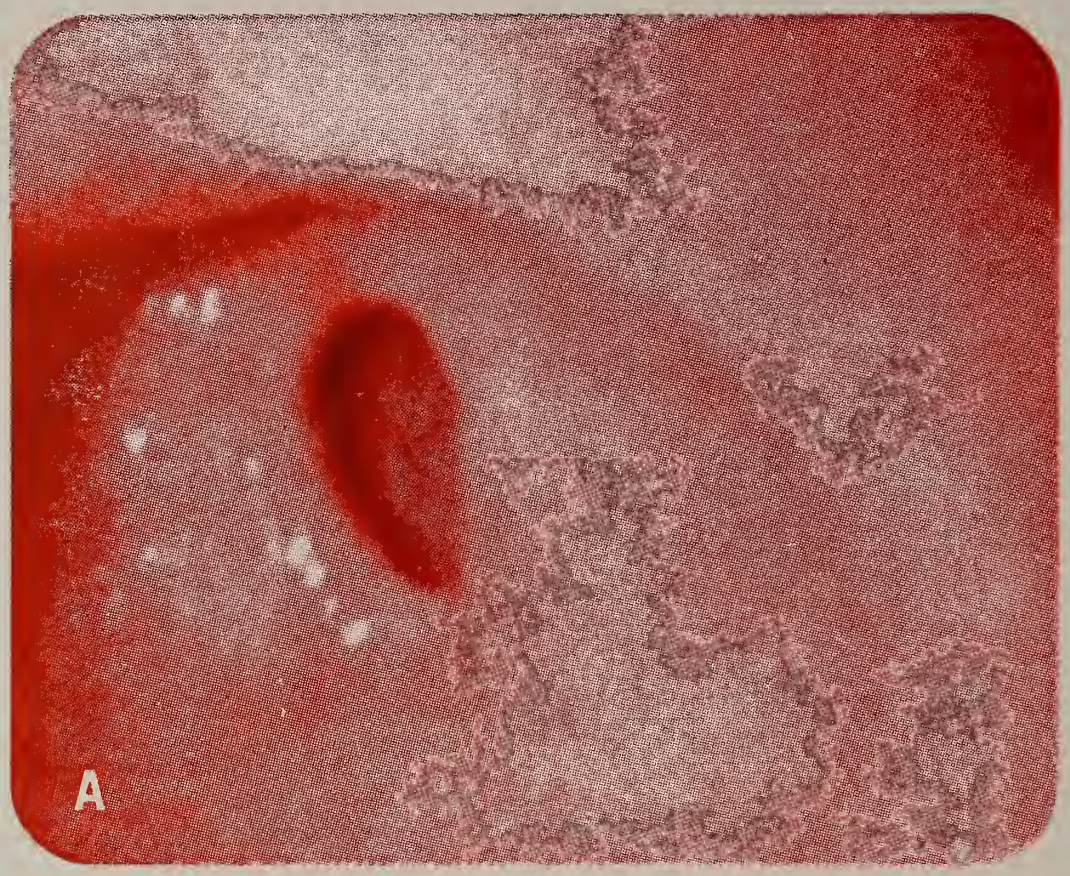
The discreet use of alcohol causes no harm to one with ischemic heart pain. The effect is to relieve the pain and provide brief protection, partly through coronary vasodilatation, partly through sedation. Alcohol, however, is no substitute for nitroglycerin and its abuses and their consequences are well known.

The caffeine in coffee, by stimulating increased cardiac work, may induce angina in a few sensitive patients. The premature atrial or ventricular beats and occasional supraventricular tachycardias associated with coffee-drinking may also lead to angina.

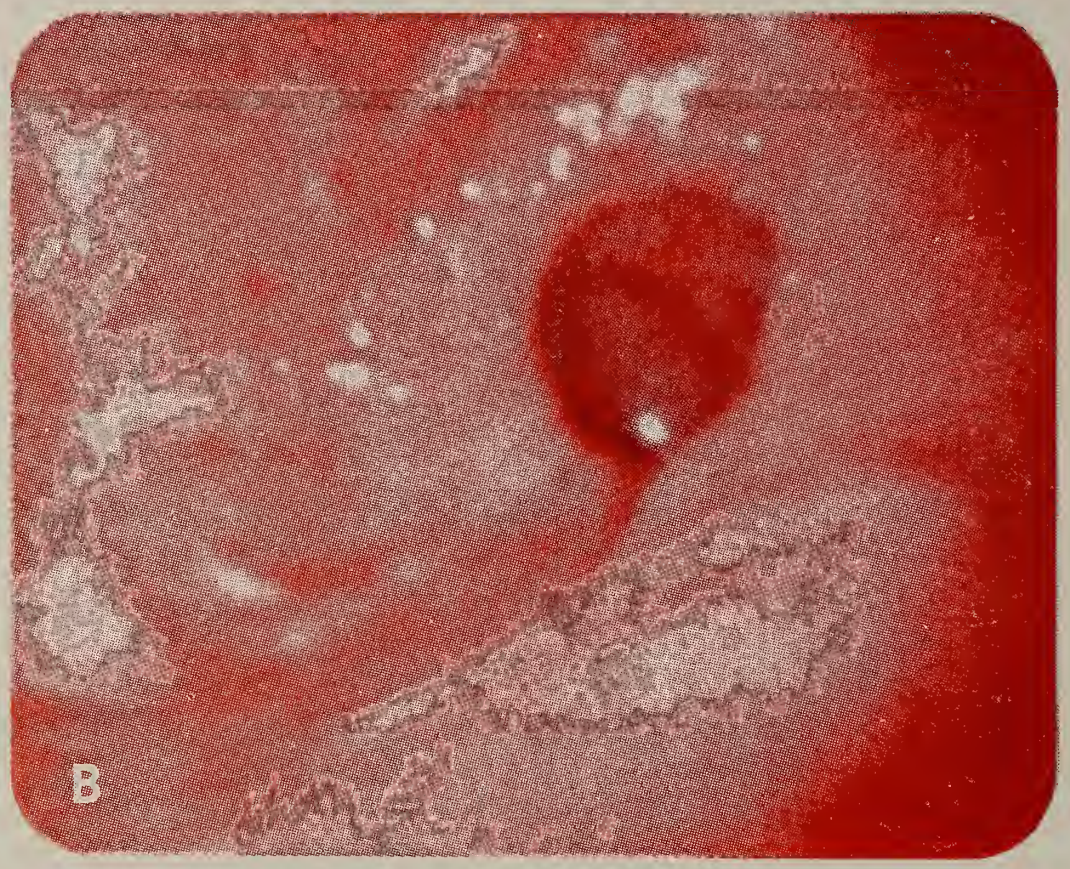
Travel for these patients is not prohibited. Moving to a warmer climate in the colder parts of the winter would be to the advantage of the majority of patients. Air travel with modern, pressurized cabins is suitable provided the patient is not frightened by airplanes. Long automobile trips when the patient is at the wheel should be avoided.

A review of general and supportive measures pertaining to cases of angina pectoris makes it clear that there is a certain amount of tailoring

(Continued on Page 30)



Which Is Pyloroplasty with Vagotomy?
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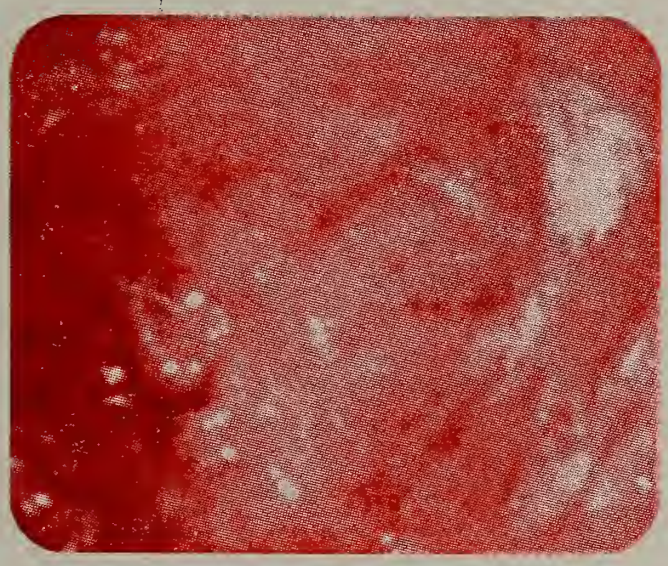
Photographs—Harry Barowsky, M.D., Lawrence Greene, M.D., and Robert Bennett, M.D., from a Scientific Exhibit presented at the Annual Meeting of the American College of Gastroenterology, Bar Harbour, Florida, Oct. 24-27, 1965.

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Atropine, on the other hand, required 0.8 mg. intravenously, or twice the normal dose, to achieve a similar effect. This high dose of atropine resulted in expectedly adverse side effects.

Pro-Banthine, in minimal dosage, produces effects similar to pyloroplasty and vagotomy without the disadvantages of permanent post-vagotomy sequelae.

The intragastric photograph A is of a patient who has had pyloroplasty with vagotomy. Photograph B is of a patient given 6 mg. of Pro-Banthine.

Indications: Peptic ulcer, functional hypermotility, irritable colon, pylorospasm and biliary dyskinesia.

Oral Dosage: The maximal tolerated dosage is usually the most effective. For most *adult* patients this will be four to six 15-mg. tablets daily in divided doses. In severe conditions as many as two tablets four to six times daily may be required. Pro-Banthine (brand of propantheline bromide) is supplied as tablets of 15 mg., as prolonged-acting tablets of 30 mg. and, for parenteral use, as serum-type ampuls of 30 mg.

Side Effects and Contraindications: Urinary hesitancy, xerostomia, mydriasis and, theoretically, a curare-like action may occur. Pro-Banthine is contraindicated in patients with glaucoma, severe cardiac disease and prostatic hypertrophy.

SEARLE

Research in the Service of Medicine

THE MANAGEMENT OF ANGINA PECTORIS

(Continued from Page 27)

to be done to get the most effective regimen for the individual patient. One technique to aid this is to have the patient keep a diary or log for a day, a week, or longer, recording in chronological order every activity of each 24 hour period. Notations should be made concerning the exact time of anginal pain and dose of nitroglycerin required to obtain relief. If this is carefully and comprehensively kept, one can go over the record step-by-step offering many pain-sparing suggestions to the patient. Long term habits may be aggravating his condition. Unless encouraged to make a thorough written inventory, it may never occur to the patient to discuss the matter with his doctor.

Tranquilizers, such as meprobamate, and sedatives, such as phenobarbital, have a place in the management of his disorder. Their major use should be in those prone to chronic anxiety as distinguished from the expected anxiety associated with the potentially fatal arteriosclerotic heart disease. It is probably an injustice to place all patients with angina on cerebral depressants, particularly if the benefits of thorough counseling and general measures have not been exhausted.

Specific Drugs

The main pharmacologic agent available for defense against the anginal pains is nitroglycerin taken by the sublingual route. Whether the drug relieves pain by increasing coronary blood flow or by temporarily decreasing myocardial work is not completely clear. Relief may be obtained within one minute. Nitroglycerin is the most practical, rapid acting antianginal compound. Duration of nitroglycerin action is twenty minutes. Side effects consist of a general sensation of warmth, flushing of the face, and headache. Rarely transient dizziness or faintness may occur in sensitive individuals because of the generalized vascular dilatation produced by the drug. Serious toxic reactions are unknown. Amyl nitrite by inhalation is slightly faster but is awkward because of glass ampules which must be broken for use.

Despite the relative directness and simplicity of this therapeutic measure against the individual anginal attack, one who regularly sees cardiac patients is impressed with the number of people who do not use this medicine effectively. The nitroglycerin headache is of considerable importance to some patients and is the price some pay for relief of chest pain.

Nitroglycerin is available in tablets of 1/400, 1/200, 1/150 and 1/100 grain. A frequent practice is to place all angina patients on 1/150 grain tablets without inquiring to discover if they suffer through an attack rather than experience the inevitable headache. Some can enjoy relief of pain while remaining relatively free of unpleasant side effects on adjustment of the dose of nitroglycerin. Others may have the intensity of the headache decreased. Salicylates may be employed to some advantage in these. Some patients do not know that it is advisable to take nitroglycerin prophylactically, even though they have long known what would induce a pain and when it would occur. It is often a simple matter for a physician to interview a subject and pinpoint the events which precipitate angina in the patient's daily life. He should be encouraged to fortify himself with nitroglycerin before performing pain-producing acts. Some cardiologists have used a regular hourly or two-hourly schedule of doses during waking hours. The strength of nitroglycerin will deteriorate over a period of months; this should be remembered when patients appear to have lost their responsiveness. A new prescription should be written and the patient instructed to insure that tablets are kept in a dry, dark, and preferably, cool environment. A new supply should be dispensed every 3 months.

Questioning patients as to (1) whether or not they carry nitroglycerin with them when away from home; (2) how many tablets they average per day, and (3) why they fail to take the medicine one can spot peculiar attitudes or inhibitions against the use of the drug. For example, a public official in a small community avoided using nitroglycerin during his working day because he feared townspeople would believe he used narcotics or nerve pills. Another patient was reluctant to use nitroglycerin at home when his wife was there because she always became upset and worried about his condition when she saw him taking the tablets. Occasionally patients can be found to be using the drug sparingly because they fear they might develop tolerance to the point of unresponsiveness. A rare patient will say he doesn't want to "get dependent on them." Concern over possible ill effects from the drug is harbored by some patients, particularly those impressed by the associated headache. Proper education of these persons, and their spouses in some instances, can provide a more comfortable life for them.

The twenty minute duration of action of nitroglycerin (sublingual) impairs its usefulness in a role of providing sustained protection against pains. However, several long-term antianginal drugs are in use. Pentaerythritol tetranitrate, an oral preparation, among these has had the widest usage. The most common pharmacologic explanation of its action is coronary vasodilatation with increased available blood nutrients for potentially ischemic areas of the myocardium. Double blind investigations in which the drug was compared to a placebo as to the effectiveness in decreasing the frequency of anginal pains in susceptible patients have shown that in the greater percentage pentaerythritol tetranitrate was no better than the placebo. In a different type of test of efficacy the capacity of the agent to prevent ST and T electrocardiographic changes during exercise tests fell clearly below that of sublingual nitroglycerin. It should be observed that the results of the many studies done on the usefulness of this agent are far from uniform. It follows that a patient posing a management problem should be given a trial to see if he is among that minority of patients who do respond to long term antianginal drugs.

The merits of isosorbide dinitrate have not drawn attention until recent years. This drug may be used sublingually or orally with good absorption. By the sublingual route its onset of action is comparable to that of nitroglycerin, but somewhat slower, although its duration may be longer. Several controlled double-blind studies show the oral preparation has performed better than a placebo and pentaerythritol tetranitrate. A final opinion of its effectiveness awaits further observations.

Nitroglycerin ointment (nitrol ointment^{R}) containing 2% nitroglycerin in lanolin and white petrolatum base, sold in tube form has been recommended by a few authors. An initial dose of one-half inch is extruded and applied to the skin surface (one inch contains fifteen mg. nitroglycerin). Absorption from the skin is sufficient for protection against pain but slow enough to have a sustained effect. The act of self-application of the medication to the precordium seems to have an added psychologic benefit in certain patients. The active business executive might find the preparation inconvenient to use during the day, but the problem patients with nocturnal angina or with semi-invalidism due to angina can derive the desired relief. Data based on controlled double-blind investigations have not been documented.

As a general precaution sudden withdrawal of nitroglycerin ointment and others of the long term antianginal group may in some individuals result in a period of increased angina. These latter drugs are merely supplements in the treatment of angina. Nitroglycerin tablets should be kept available as they are the keystone of anginal therapy.

Dipyridamole (Persantin^{R}) a drug with a myocardial metabolic effect plus the property of increasing coronary flow has been disappointing when studied by a double-blind technic.

Table I outlines dosage, indications and duration of action of some of the drugs commonly employed for treatment of angina pectoris.

The measures discussed above aim at relieving the cardinal subjective feature of a form of heart disease. The physician must also concern himself with that which can be done to counter the arteriosclerotic disease process itself and to ward off myocardial infarction, if possible. The topic of cholesterol-lowering agents, estrogens, unsaturated fat-augmented diets, long-term anticoagulation, etc. is beyond the intent and scope of this discussion and will not be explored further.

Other Forms of Therapy

The utilization of antithyroid medication, specifically, radioactive iodine, has been shown to reduce the number and severity of anginal episodes. It is necessary to render the patient myxedematous in order to achieve this effect, however, and the management of the patients' hypothyroidism is often a more difficult disease to control than the original uncomplicated disorder. This form of therapy should be undertaken only by one with experience in this field.

The surgical approach to coronary artery disease deserves some comment. Suffice to say that the procedures thus far proposed and evaluated, do not alter the basic pathology of the disease; though they may provide some rather temporary and questionable benefit. There appears to be no really satisfactory surgical procedure that may be offered the coronary patient.

Summary

The medical management of angina pectoris, a manifestation of atherosclerotic coronary artery disease, has been discussed. The proper appraisal of concomitant diseases; the importance of their correction; the approach to induced stress, emotional or otherwise; and therapeutic measures available have been stressed.

TABLE I. PHARMACOLOGIC AGENTS FOR THE TREATMENT OF ANGINA PECTORIS

PREPARATION	ROUTE OF ADMINISTRATION	DOSE	ONSET	DURATION	INDICATION
Amyl nitrate	Inhalation	0.2 cc PRN	10-15 seconds	5-7 minutes	Immediate pain relief
Nitroglycerin	Sublingual	1/400-1/100 grain PRN	1-2 minutes	10-30 minutes	Immediate pain relief, prophylaxis
Nitroglycerin Ointment (Nitrol Ointment[R])	Topical	½ inch PRN	3-20 minutes	2-4 hours	Prophylaxis
Isosorbide dinitrate (Isordil[R])	Sublingual	5-10 mg. PRN	2 minutes	2-3 hours	Immediate pain relief and Prophylaxis
	Oral	5-20 mg. QID	20 minutes	4-6 hours	Prophylaxis
Erythrityl Tetranitrate (Cardilate[R])	Sublingual	7.5-30 mg. PRN	5 minutes	1-2 hours	Prophylaxis
	Oral	30 mg. QID	15-20 minutes	3-4 hours	Prophylaxis
Mannitol Hexahitrate	Oral	15-60 mg. QID	15-20 minutes	3-4 hours	Prophylaxis
Pentaerythritol Tetranitrate (Peritrate[R])	Oral	10-20 mg. QID	60-90 minutes	5-6 hours	Prophylaxis
Ethanol as Whiskey	Oral	1-2 ounces PRN	5 minutes	Approximately 3 hours	Immediate pain relief and prophylaxis
Morphine Sulfate	Intravenous, intramuscular, subcutaneously or orally.	⅛-¼ grain PRN	5-20 minutes	2-3 hours	No response to nitroglycerin, suspected infarction
Meprobamate	Oral	400 mg. QID	30 minutes	4-6 hours	Reduce the factor of anxiety

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Path CAP sule

Submitted by the College of American Pathology in connection with the South Dakota Society of Pathologists.

URINE BACTERIOLOGY

In recent years, an increased awareness of the diagnostic problems associated with pyelonephritis and other infectious renal diseases has prompted a change in the laboratory approach to urine bacteriology. The change has not resulted in new instrumentation, but rather the re-application of existing laboratory techniques to the urine specimen.

QUANTITATIVE BACTERIOLOGY

With the exception of the tubercle bacillus, the growth and identification of bacteria **per se** from a urine specimen is of questionable significance. Since the distal 1-2 centimeters of both male and female urethrae are known to harbor a resident flora, usually coliform, both voided and catheterized specimens may contain one or more of these and the significance of the individual organism cannot be established without some knowledge of the number of bacteria present in the specimen. For this reason a dilution of the specimen is plated on suitable growth medium and the organisms, after identification, are reported quantitatively. Urethral contaminants rarely are present in clean catch, mid-stream urine in numbers greater than 10,000 per milliliter. Bacterial counts that exceed 100,000 organisms per milliliter indicate significant bacteriuria and probably overt urinary tract infection. Patients with bacterial counts in between these extremes, in the 50,000 organisms per milliliter range should be retested. It is recognized that patients with chronic pyelonephritis rarely may have surprisingly low bacterial counts (less than 100,000 organisms per ml.) and that normal individuals will occasionally have high counts in the absence of urinary tract disease (recent pelvic manipulation, labial contamination, etc.). For these reasons the microscopic study of sedimented specimens is an essential part of the urine bacteriology.

URINE MICROSCOPY

In addition to gram-stain and culture procedures to determine the numbers and species of bacteria present in the specimen, urine sediments are stained by one of several methods to aid in the recognition of casts and cellular components.

Few laboratory procedures contribute as much pertinent information as a careful study of these urine deposits.

CASTS

The **hyaline cast** is the most common type found in urine sediment. The hyaline material, formed in the tubule, is essentially protein material. A small number of these casts are found in normal urine; strenuous exercise will produce an increase in numbers. Large numbers of hyaline casts frequently occur concurrently with proteinuria and may be suggestive of functional renal impairment.

Epithelial cell inclusion casts may also be present in normal urine although a marked increase indicates damage or irritation to the renal epithelium.

Blood cell casts indicate renal hematuria and always merit further studies. Red cell casts are not found in normal urine.

Pus cell casts are most frequently associated with kidney infection but their presence may indicate renal inflammation.

Bacterial casts are diagnostic of renal infection.

CELLULAR INCLUSIONS

Renal and bladder epithelial cells may be found in normal urine but again, only in limited numbers. Pus cells, when present in large numbers, of course, indicate pyuria. Occasionally they will be found as vaginal contaminants.

Crystals may be present in normal specimens (oxalates, sodium chloride) or during therapy (sulfas) and must be considered individually.

SPECIMEN COLLECTION

Urine specimens may be collected by catheterization but a clean catch mid-stream specimen obtained after thorough cleansing of the glans or female urethral meatus is equally suitable. The specimen should, of course, be collected directly into a sterile container with a close fitting lid. Since urine is a good growth medium for bacteria, specimens not delivered to the laboratory within one-half hour should be refrigerated. Pus cells and casts will disin-

(Continued on Page 37)

CONGENITAL GRANULOCYTIC LEUKEMIA IN A STILLBORN INFANT*

By

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A case of congenital granulocytic leukemia, in a stillborn infant, an extreme rarity in medical literature, is reported. It indicates that leukemia can arise in utero and raises the question of possible placental transmission of a viral or other etiologic agent. It also points out the potential value of post-mortem examination in stillborn infants, frequently regarded as an unrewarding task to the pathologist.

Clinical Summary

This stillborn fetus was the product of a gravida V para III abortion 0 ectopic I, 37 year old Japanese female in her 37th week of pregnancy. The mother had no past history of operation or serious illness. There was no family history of Down's syndrome or leukemia. The mother received no x-ray other than a routine chest film during her pregnancy. She was over 100 miles from the atomic blasts in Japan in 1945. The three siblings (ages 14, 8 and 12) are living and well, and are progressing normally in school.

The pregnancy was uncomplicated by disease. No fetal movement was felt for one week before delivery. It was not definitely known when the fetal heart was last clearly heard, but it was definitely absent on admission.

Physical examination on admission and at other times during pregnancy was within normal limits. The blood group was A positive. The hematocrit was 38% and the hemoglobin 12.4 gm%. The serology was negative.

The delivery was by low forceps using Trilene and Pudendal block with Xylocaine as anesthesia. The child was stillborn and macerated at delivery.

Postpartum the mother remained well. Blood examination two months postpartum showed a hematocrit of 44%, hemoglobin 13.4 gm%, WBC 6,841. Differential had 45% polys, 3% bands, 48% lymphs, 3% monocytes and 1% eosinophils. A cell pool screening test for atypical blood group antibodies in the serum 24 hours after delivery revealed no atypical antibodies.

Autopsy Examination

The body was that of a markedly macerated infant weighing 3,200 grams and measuring 50 cm. long. The skull bones were overriding. The circumference of the head, occipitomental, was 35 cm. The circumference of the head, biparietal, was 34 cm. The circumference of the chest at the nipple line was 24 cm. There was marked maceration of the skin with peeling over large areas of the body. Some areas showed fresh vernix caseosa. The eyes were swollen and closed. The nose and ears were otherwise unremarkable. There were no stigmata of Down's syndrome. The back was unremarkable. The genitalia were normal female. All organs were soft and friable on gross examination.

There was thin hemorrhagic fluid in all the body cavities, 20 cc in each pleural cavity, 5 cc in the pericardial cavity, and 30 cc in the peritoneal cavity.

The larynx and pharynx were negative. The thyroid was normal in size, shape and consistency. The thymus was normal in size and shape, and weighed 10 grams (normal 12.5 grams). Cut section showed pale, lobulated surface.

The heart weighed 20 grams (normal 21 grams). The coronaries were normally positioned. The valves were thin and pliable. The epicardium, myocardium, and endocardium were pale and flabby. No congenital anomalies were noted in the heart. The aorta and vena cava were unremarkable.

The trachea and bronchi showed moderately red mucosa, but otherwise were unremarkable. The lungs weighed 85 grams together (normal 55 grams). Cut sections showed homogeneous, rubbery, dark red surface.

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* From Pathology Service at Womack Army Hospital, Fort Bragg, North Carolina.

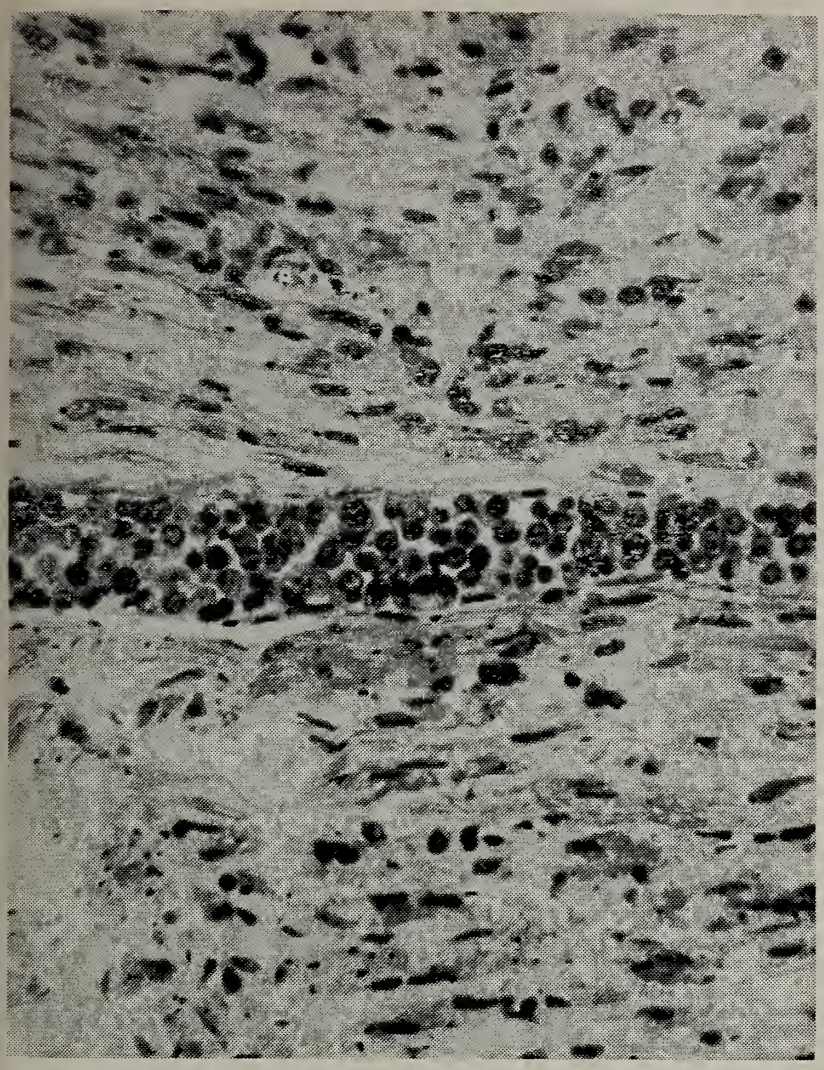


Figure 1
Vessel on myocardium distended with abnormal mononuclear cells 95x.

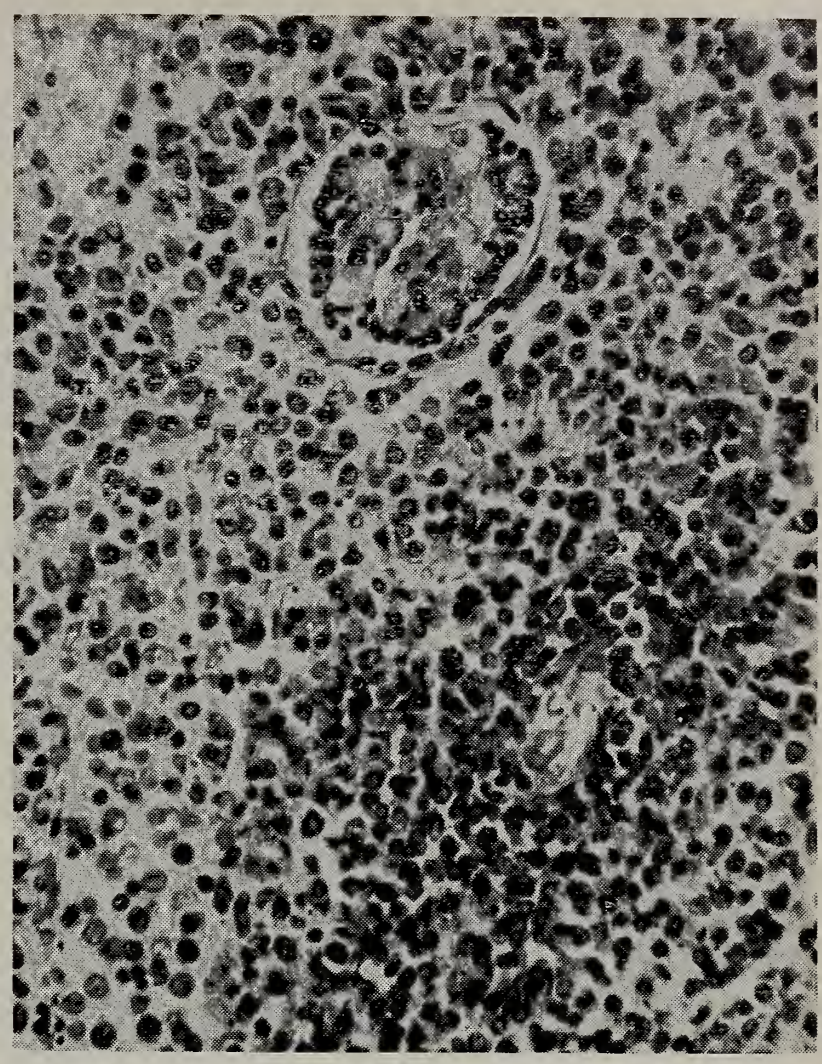


Figure 2
Marked infiltrate in kidney 33x.

The esophagus, stomach, small and large bowel were unremarkable.

The liver weighed 200 grams (normal 178 grams) and was tan-yellow. Cut section revealed homogeneous tan-yellow architecture. The bile ducts were patent. The pancreas was soft and unremarkable with normal lobular architecture.

The spleen weighed 43 grams (normal 12 grams). It had a friable, red, glistening surface. The capsule was tense. The bone marrow on cut section was pale red and abundant.

The adrenals weighed 8 grams together (normal 10 grams), and were unremarkable on cut section.

The ovaries were normal in size and shape, and the uterus was normal in size and shape for a fetal female. The kidneys weighed 60 grams together (normal 29 grams). The capsules stripped with ease, revealing a smooth surface with fetal lobulation. Cut sections of the kidneys revealed pale, swollen parenchyma. Cortex and medulla were pale and bulging on cut section. There was diffuse hemorrhagic discoloration in the pelves and ureters. The bladder was unremarkable.

The brain weighed 400 grams (normal 403 grams) and was markedly soft. The vessels at the base of the brain were unremarkable. Multiple cut sections of the brain revealed no evidence of hemorrhage.

The placenta weighed 750 grams and was 17 cm. in diameter and 2.5 cm. in thickness. The fetal membranes were brown-green and lusterless. The umbilical cord was 30 cm x 2.5 cm, centrally placed, and had three normal vessels. The external surface was discolored red-pink, as was the fetal surface of the placenta. Cut section of the placenta showed soft, red-pink parenchyma with no areas of infarction or discoloration.

Microscopic

Organs examined included heart, lungs, spleen, liver, pancreas, kidney, placenta and central nervous system. There was marked autolysis of all organs. The large blood vessels and capillaries of all organs were distended with large cells with round or slightly lobulated nuclei and small amounts of amphophilic cytoplasm. The nuclei were vesicular with small round-to-oval nucleoli. In addition, an infiltrate of cells similar to the above-marked involved the spleen, kidney, liver and bone marrow. The splenic architecture was obliterated. The capsule, subendothelial regions of the veins

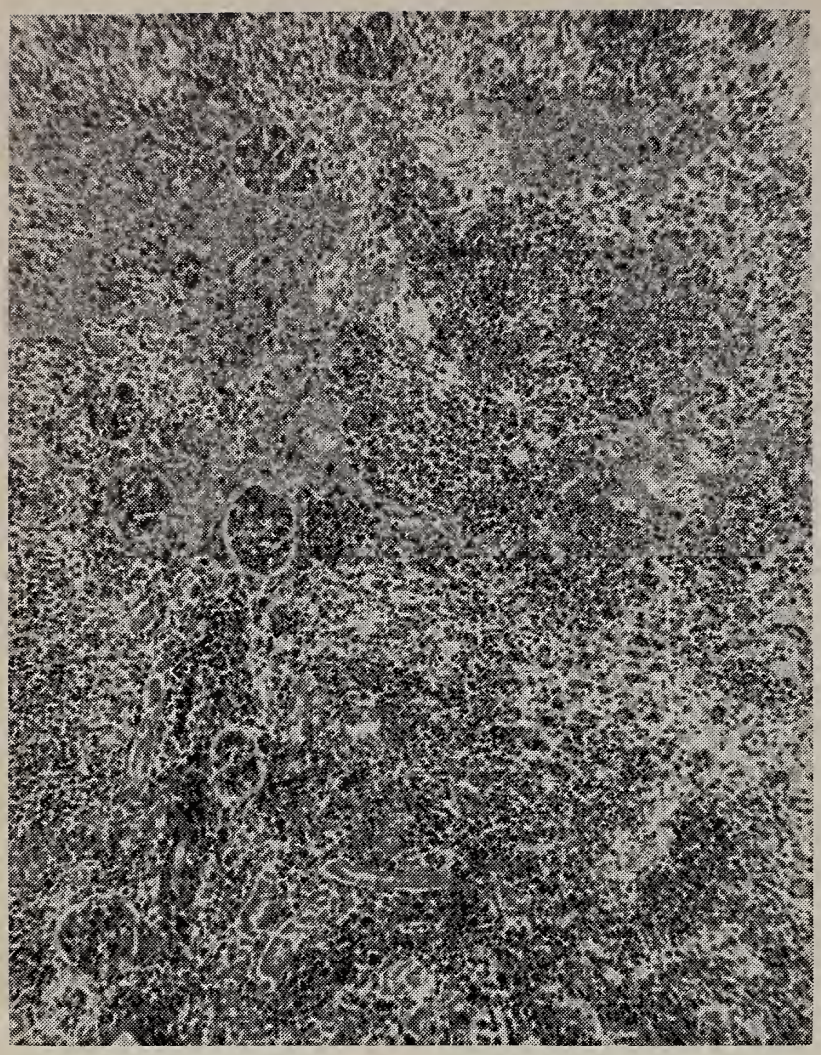


Figure 3
High power of kidney infiltrate 95x.

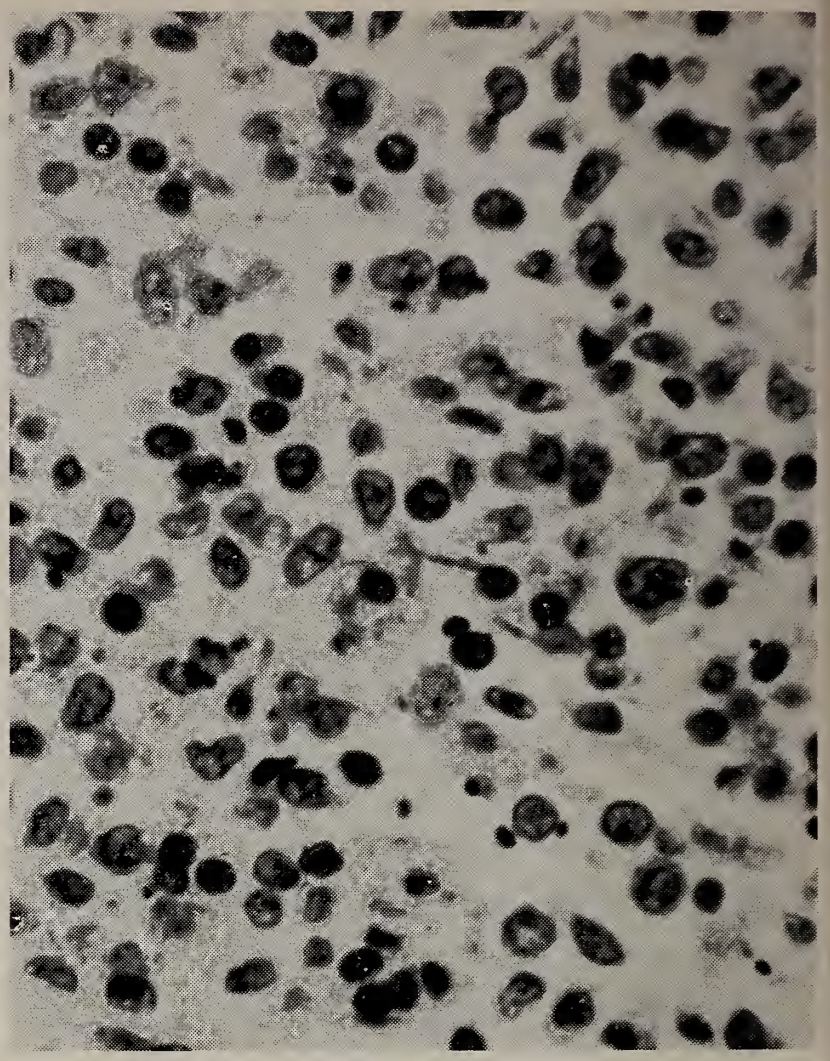


Figure 4
Cellular detail of leukemic infiltrate. Note occasional lobulated nuclei 400x.

and the periarterial regions in the trabeculae were moderately infiltrated. The kidney showed particularly marked infiltration with loss of tubules over wide areas due to massive replacement by a dense mononuclear infiltrate. There were uric acid crystals seen in medullary tubules. The marrow from the vertebrae were markedly infiltrated by cells similar to those described above. Rare megakaryocytes were present. The liver showed the mononuclear cells above stuffing the sinusoids.

Final Diagnoses

1. Stillbirth with maceration.
2. Leukemia, acute, granulocytic.

Discussion

The microscopic findings of marked infiltration of the organs by immature white cells was unsuspected clinically and by the prosecutor at the time of autopsy examination. The friable consistency and pallor of the organs was attributed to prolonged intrauterine fetal death.

The morphology of the cells is the main reason for considering the case as myeloid leukemia. A negative prenatal serology in the mother makes syphilis unlikely. Erythroblastosis fetalis is also unlikely because of negative test for atypical antibodies in the mother's serum 24 hours after delivery. It is possible that there was an ABO incompatibility, but the mother was A positive and intrauterine fetal death from ABO incompatibility is quite rare. In an ABO incompatibility the mother is usually Group 0 and the immunizing antigen A. The mother's blood group rules out hemolytic disease by Anti A or Anti D, and the absence of unusual blood group antibodies in the mother's serum rules out hemolytic disease due to most other causes of hemolytic disease.

Finally, the morphology of the cells is strongly against erythroblastosis fetalis. Sepsis is also unlikely since the marked infiltrate of cells in the organs would be unlikely in a septicemia. Postmortem culture of lungs grew one colony of E. coli, but this is undoubtedly due to contamination.

Slides of this case were sent to the Air Force Institute of Pathology (A.F.I.P.) and the members concurred that this case represented granulocytic leukemia.

Congenital leukemia is rare, but according to Pierce[1] forty-five (45) cases were reported through 1959. Pierce reported one case of stillbirth with congenital leukemia, and Reimann et al[2] reported another. Both of these cases were classified as myeloid leukemia, as are the majority of cases of congenital leukemia.

Other than its rarity, the case is significant in several aspects. First, it demonstrates that the leukemic process can occur prepartum. The mother is perfectly well several months postpartum, and has no evidence of leukemia. This is to be expected since mothers with leukemia do not produce leukemic infants.[3]

The case reported by Cramblett[4] in which a leukemic mother produced an infant who died of an identical disease nine months later is the only report of possible transmission of leukemia from mother to infant. Spread of other malignancies from fetus to mother also does not occur, although the placenta may be involved as in this case.[5] However, transplacental passage of leukemic cells has been demonstrated from mother to fetus in small numbers by Rigby et al.[6]

Whether or not leukemia cells can go from fetus to mother is not known, although the fact that red cells pass from fetus to mother has been demonstrated many times. If leukemia is caused by a virus, it is interesting to speculate that the disease may be similar to toxoplasmosis or rubella with severe disease or effects in the fetus and few effects in the mother. However, infants with congenital leukemias do not have leukemic mothers.[1, 2]

Finally, this case points out the importance of routine autopsy examination of stillborn infants.

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PathCAPsule—

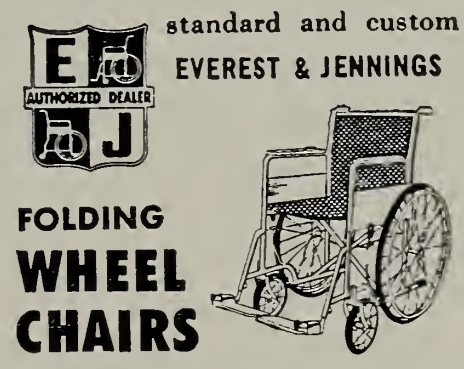
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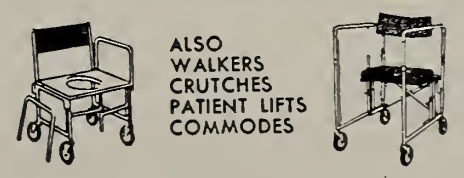
tegrate quite rapidly in acid urine if the specimen is held at room temperature. For these reasons it is essential to examine urine specimens immediately.

The urine specimen, when correctly collected and promptly delivered to the laboratory, has the potential to yield much practical information to the physician. This potential is manifest when quantitative and qualitative studies relative to the bacteria present in the specimen are reported. Staining techniques that aid in the identification of urinary casts and cellular elements are an integral part of these studies.

Clinical Investigation — Government Style

A new drug may not be shipped across state borders for administration to a human until the sponsor of the drug (who may be the investigator) has filed a request for exemption for such use with the FDA . . . He must describe and identify the source of the drug and its manufacturer; he must describe previous animal studies with the drug to show that it is reasonably safe to initiate human studies; he must give evidence of his professional qualifications and his facilities for investigation. Finally, the investigator must certify that he will obtain consent from the persons receiving the drug except where this is not feasible or, in the investigator's best judgment, is contrary to the best interest of the subjects. The sponsor must also make progress reports at appropriate intervals, not exceeding a period of one year. He must promptly report any adverse effect which is reasonably regarded as due to the drug. He must maintain records for a period of two years after the drug has been approved or disapproved, or after his investigations have been discontinued. Joseph F. Sadusk, Jr., M.D. to Association of Military Surgeons, November 17, 1965.

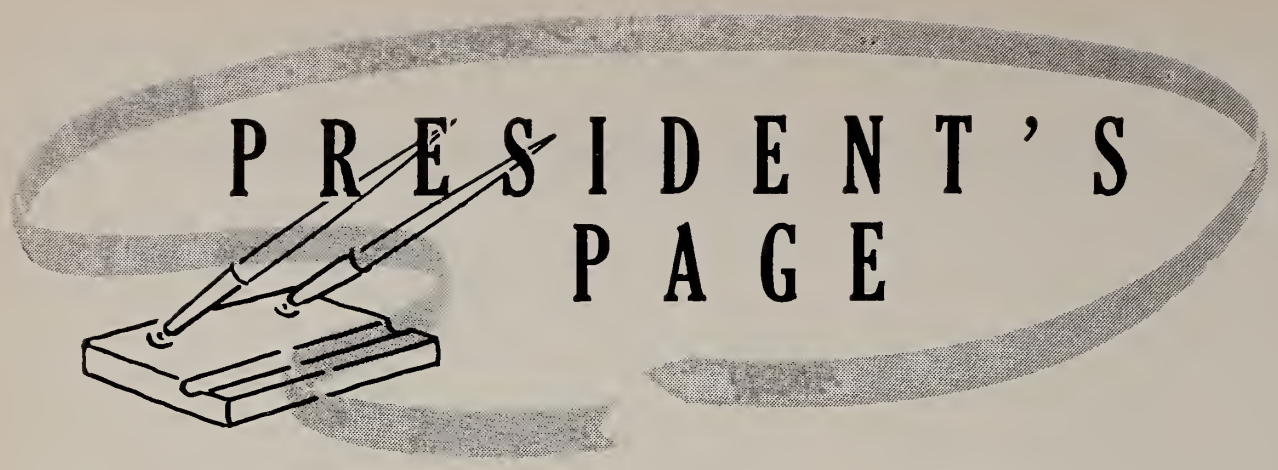




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Fellow Doctors:

On the week-end of January 8th and 9th, 1966 the Council of the South Dakota State Medical Association and the Corporate Body of the Blue Shield held meetings in Huron. These meetings had been preceded by a meeting of the Board of Directors of the Blue Shield. The Blue Shield Board discussed at length, the advisability of an exhaustive study into the feasibility of creating a Blue Shield Policy without any fee schedule, where the benefits to the policyholder would be paid on the basis of the Doctors' usual and customary charges. The Board of the Blue Shield felt that such a policy could have a great potential as it would appeal to the customer, would be relatively easy to administer and it would pay benefits as determined by the doctors' usual and customary charges.

In order that the Board may determine the premiums of such a policy, it is necessary for the Blue Shield to get a profile of the doctors' usual and customary charges. This information would be presented to an actuary for determination of the premium necessary for such a policy.

The Board of Directors asked the Council at its January 8th meeting for authority to survey its physicians in order that a profile of our doctors' charges may be obtained. The Council was presented the facts and the general ideas for the anticipated plan of investigation of the feasibility of such a policy. After due discussion a motion was made and seconded that the Council of the S.D.S.M.A. give authority to the Blue Shield Board to survey its physicians to obtain a profile of their usual and customary charges.

The motion carried unanimously! The Council further stated that they expressly wanted it understood that they were only giving authority to make such a survey and that such information should at all times remain strictly confidential.

The Blue Shield Board felt certain the Council would give authority to make a survey of its physicians and in anticipation called a special meeting of the Corporate Body of the Blue Shield to be in session January 9th, 1966. Again at this meeting the Directors, the President of the Board of Directors, and the Executive Director of Blue Shield presented to the Corporate Body members the desirability of a study of a new policy, without a specific fee schedule, that would pay the doctors' usual charges. There seemed to be a slight misunderstanding of the intentions of the Board of Blue Shield by some of the delegates of the Corporate Body. Further explanation and discussion made it clear to all the delegates present that the Board would like authority and direction to thoroughly investigate the feasibility of such a policy and to bring it back to the Corporate Body for its deliberations as to whether or not it should be further processed and offered to the public. A motion was made, seconded, discussed, and carried unanimously, that the Blue Shield make such a comprehensive study and present it to the Corporate Body as soon as such a study has been completed.

In the next week or two each physician will be receiving a survey sheet which will be sent out by Blue Shield. Each doctor will be asked to fill out the survey sheet with his usual and customary charges, but only those procedures pertinent to his own practice. Our Blue Shield can only come up with an honest comprehensive study if we all work together, by each contributing our part to the study. Therefore I stress in all sincerity, the necessity for each of us filling out and returning the survey sheets. It is necessary that we be honest and realistic in our reports so that the Blue Shield Board may formulate a policy that is structurally sound, feasible to sell and that eliminates the necessity of fee schedules and income levels.

I am asking each of our doctors to seriously consider this study.

Sincerely,

Paul Hohm, M.D.
President South Dakota State Medical Association

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News Notes • Changes • Births • News

Pop's Proverb

Do not be ashamed to return that long-borrowed book. It may re-establish a friendship.

NEWS NOTES

BLACK HILLS FALL SEMINAR, Rapid City, South Dakota, August 5-6, 1966. Publicity chairman — **John F. Leeds, M.D.,** 615 Kansas City Street, Rapid City, South Dakota, 57701.

* * *

A "Symposium on Trauma" will be sponsored by the Committee on Injuries, American Academy of Orthopaedic Surgeons in cooperation with the University of Washington School of Medicine. It will be held April 4-7, 1966 at the Olympic Hotel in Seattle, Washington. The course is acceptable for 23 hours of Category II credit for General Practice. Registration fee is $75.00 with residents and interns admitted free by letter from the Chief of Service. For further information write: Kirk J. Anderson, M.D., 1011 Summit Avenue, Seattle, Washington 98104.



George S. Squibb (center), vice president for legal and public affairs, E. R. Squibb & Sons, examines a 17th century Italian majolica jar that was recently presented together with three other pharmaceutical ceramic objects to The Smithsonian Institution by the pharmaceutical firm. Earlier this year Squibb added six rare objects of ancient art to the Institution's collection of ancient pharmaceutical memorabilia. This collection is to be part of a new pharmacy section in the Museum of History and Technology.

Shown with Mr. Squibb are: Dr. Robert P. Multhauf (left), chairman of the department of science and technology; and Dr. Sami Hamarneh (right), curator, division of medical sciences.

RADIOISOTOPE FILM AVAILABLE

A new film on the application of radioactive drugs in specific diagnostic problems has recently been released by E. R. Squibb & Sons for use by professional medical groups. The film is suitable for physicians interested in the role nuclear medicine can play in the clinical management of their patients. It is also of in-

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terest to residents, interns, nurses, technicians and administrative staffs.

The film, "Radioisotope Scanning in the Clinical Management of Patients," features Millard N. Crowl, M.D., assistant professor of radiology at Hahnemann Medical College and Hospital in Philadelphia, Pennsylvania. It presents a brief review of the physical fundamentals and a discussion of the instrumentation associated with the clinical nuclear medicine studies. Basic principles of radioisotope scanning are described, covering its development into an automatic counting, recording, and data presentation system.

The 16 mm., color, sound film is available at no charge for professional medical groups from all Squibb regional offices or by writing to the New York office at 745 Fifth Avenue.

DISTRICT OFFICERS

Election of officers has been held by many of the District Medical Societies recently. The following is a roster of the new officers elected to date.

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"THE BIG HEART"

The American College of Physicians will present postgraduate course #13, "The Big Heart," at Baylor University College of Medicine, Houston, Texas, March 7-11, 1966. Registration forms and requests for information should be directed to Edward C. Rosenow, Jr., M.D., Executive Director, American College of Physicians, 4200 Pine Street, Philadelphia, Pa. 19104.

The Right To Prescribe — Right

This gets down to the really basic controversy, where one exists, between physicians and welfare agencies on drug costs. We are willing, indeed we are anxious to prescribe economical drugs for our patients, whether on welfare or paying their own way — but it has to be the **right** drug. It is when we are denied the opportunity to provide for our patients the proper drug for their treatment, simply on a basis of cost, that we rebel. — Burtis E. Montgomery, M.D., in **Illinois Medical Journal,** (128:614), December 1965.

How To Obtain Animals for Research

Laws to save unclaimed animals from pound gas chambers so they can serve in tests of new drugs, operations and other medical procedures have always been opposed by the antivivisectionists and their allies . . . The only escape from this trap is responsible action now to bring about proper legal solutions to problems of animal supply. Now is the time for every state to adopt pound laws like those already in effect in Massachusetts, Connecticut, New York, Ohio, Illinois, Wisconsin, Minnesota, Iowa, South Dakota, Oklahoma and Utah. — Editorial in **Group Practice,** (14:789), November 1965.

General Practitioners' Responsibility

May I earnestly recommend, therefore, that general practitioners assume as a professional responsibility the obligation of recording their personal experiences with individual drugs. It is my hope that they will pass along their conclusions, based on collective experiences, to the companies who develop and produce those drugs. It is also my hope that they will pass along such data to the Food and Drug Administration when and if the occasion warrants. May I reiterate that as members of a great profession general practitioners have a responsibility not only to their patients today, but the patients of tomorrow and to the most important mission on earth, the discovery of new agents to conquer the still unconquered diseases that afflict mankind. — Theodore G. Klumpp, M.D. in **GP,** (32:211), November 1965.

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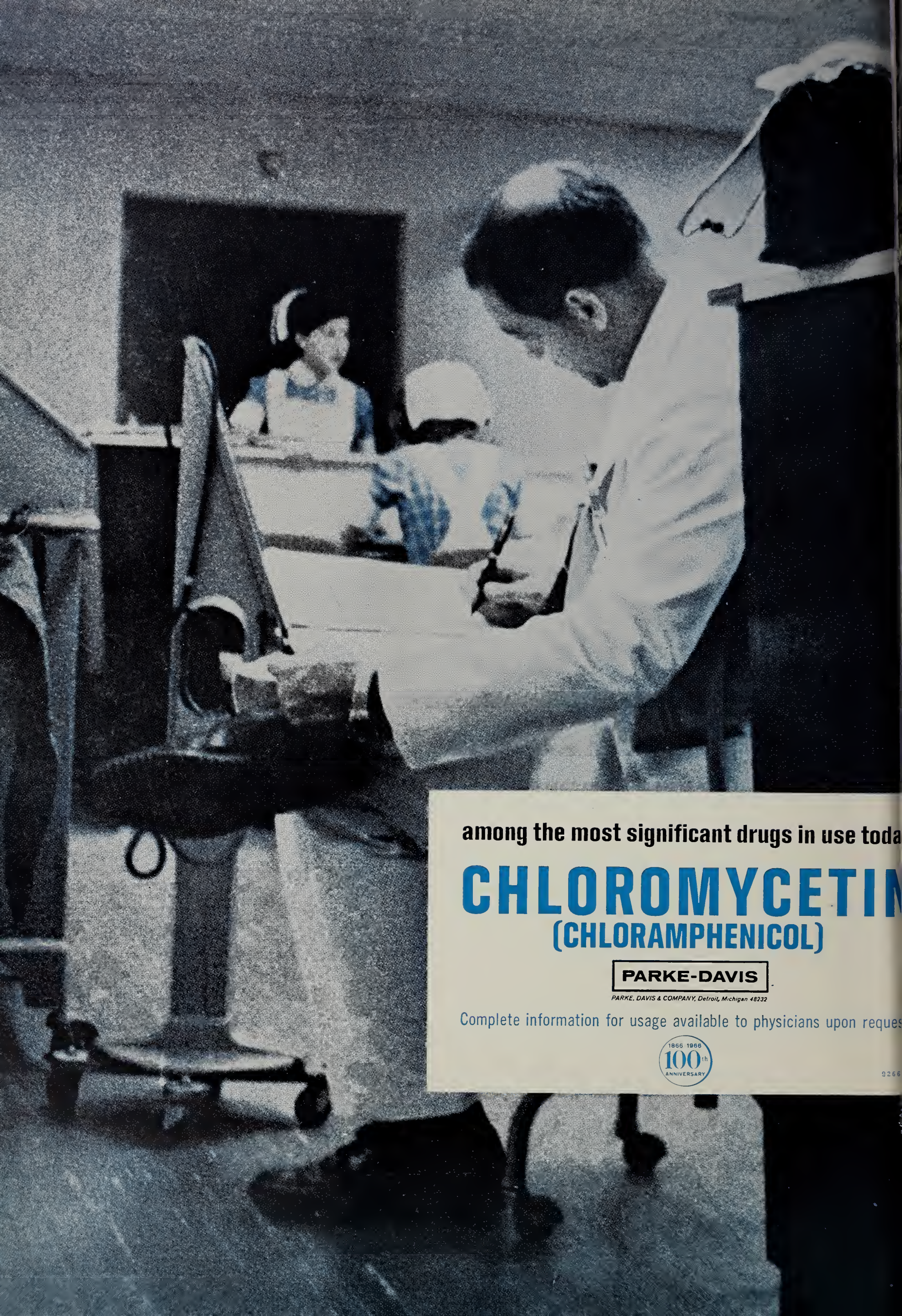
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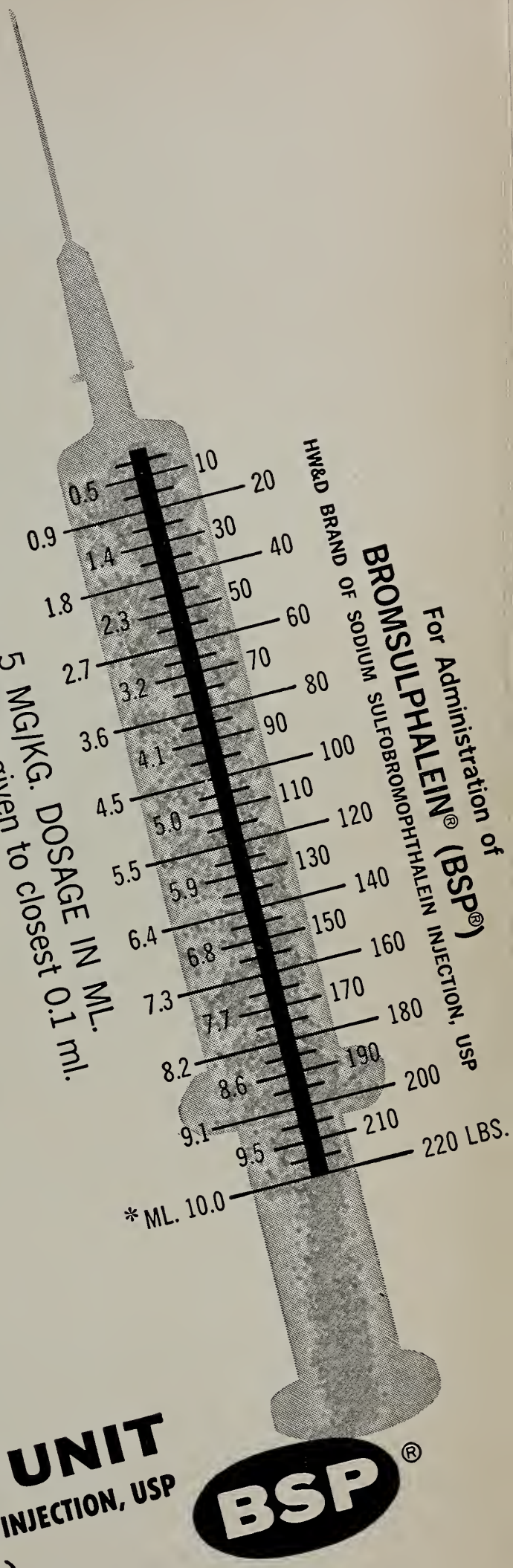
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Volume XIX **March, 1966** **Number 3**

CONTENTS

The Increasing Menace of Bronchogenic Cancer 13
Alton Ochsner, M.D.

Idiopathic Pulmonary Hemosiderosis 17
W. R. Taylor, M.D.

Human Salmonella Typhimurium 20
Roscoe E. Dean, M.D.

Some Technical Aspects of Salmonella Infection 21
Ben Diamond, State Health Laboratory, Pierre, S. Dak.

PathCAPsule — Enzyme Studies Useful in Suspected Myocardial Infarction 22

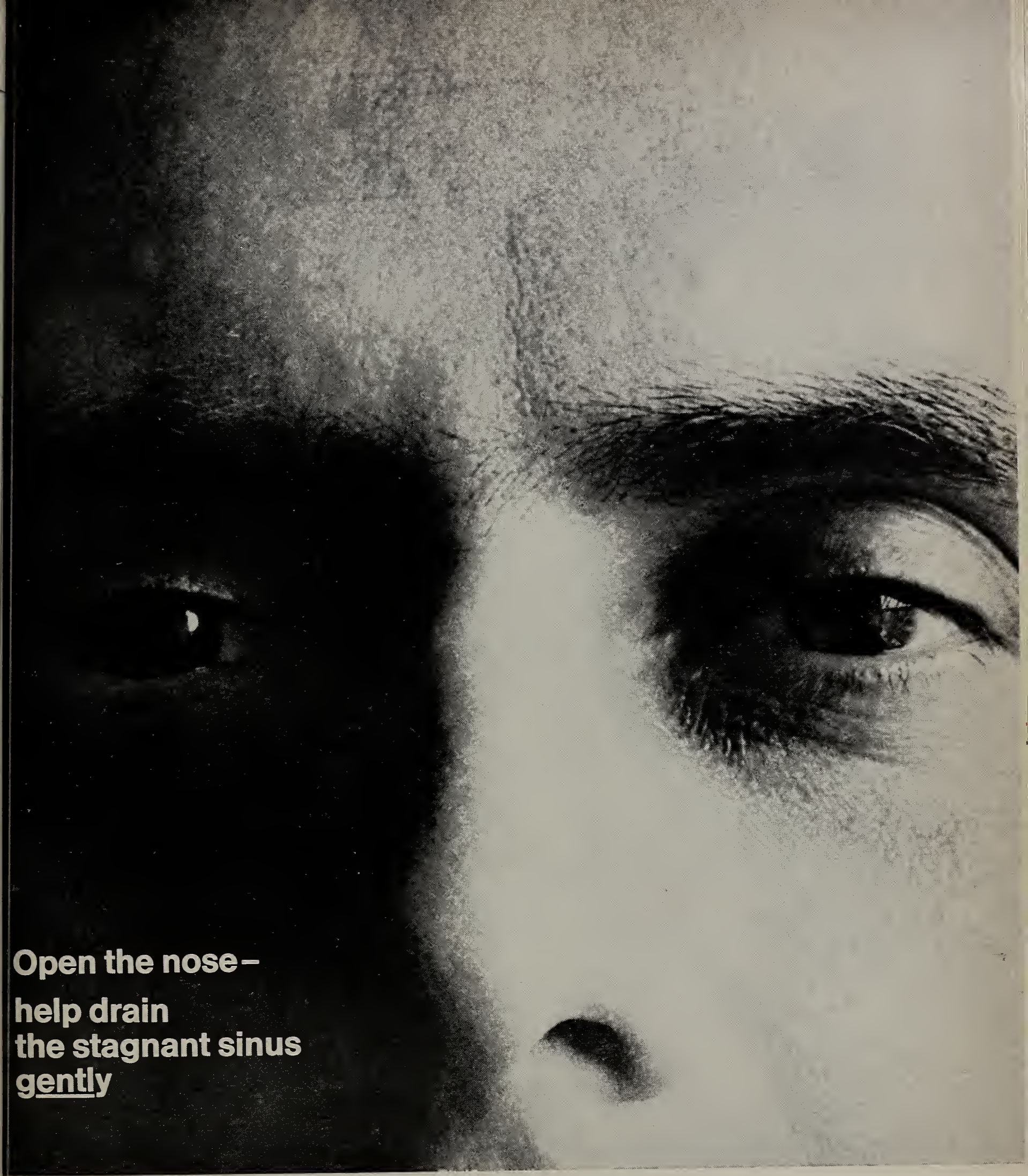
Letters 23

President's Page 26
Paul Hohm, M.D., Huron, S. Dak.

This Is Your Medical Association 27

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*Proctor, D. F.: The Nose, Paranasal Sinuses, and Ears in Childhood, Springfield, Ill., Charles C Thomas, 1963, p. 34.

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THE INCREASING MENACE OF BRONCHOGENIC CANCER*

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Every physician should be concerned about the tremendously increasing incidence of bronchogenic cancer not only because this disease is responsible for as many deaths as are automobile accidents, but also because it is almost always preventable. Until about 1935 primary cancer of the lung was extremely rare and affected both sexes with equal frequency. At that time, however, the incidence in men began to increase rapidly and has continued to increase to the present time. The incidence in women has also increased but not as much as in men. The reason for this tremendous increase in the mid-thirties is that at the beginning of the first World War, men began to smoke cigarettes heavily, and the twenty years between 1914 and 1935 is just about the length of time that is necessary for the cancer-producing effect of cigarettes to become evident.

Bronchogenic cancer is increasing in incidence more rapidly than is cancer in any other organ in the body. It is true that the incidences of most types of cancer are increasing (the exceptions are cancer of the cervix and cancer of the stomach), but the increase is due largely to the fact that more people are living to the cancer age. This increased life span is a tribute to the medical profession. Of all patients 90 years of age, cancer will develop in a greater percentage than in those 80 years old, and of those 80 years old, cancer will develop in a greater percentage than in those 70 years of age, and so on. This is true of all types of cancer except one — cancer of the lung — whose incidence increases sharply to reach a peak at the age of 55 to 60 years, after which, with advancing years, there is a progressive decrease.

Does this indicate that the longer a person lives, the less chance he has of getting cancer of the lung? No! The explanation lies in the fact that excessive smoking of cigarettes subjects the heart and blood vessels to the deleterious effect of tobacco so that cardiovascular disease develops and the person does not live long enough for cancer of the lung to develop.

In Massachusetts, where the vital statistics are valid, cancer of the lung now supersedes cancer of the female genital tract and cancer of the breast in frequency. In 1930, cancer of the lung represented 3.08 per 100,000 population, cancer of the female genital tract 35.7, and cancer of the breast 29. In 1955, these respective figures were 42.16, 31.7, and 36.[1] In 1930 there were 2,500 deaths from cancer of the lung in the United States; in 1956, 29,000; and in 1964, 43,-100. In 1964, 43,100 deaths were due to cancer of the lung, 14,000 to cancer of the uterus, 26,000 to cancer of the breast, and 31,000 to cancer of the colon.

The incidence of cancer of the lung is increasing in all "civilized" countries where cigarette smoking is prevalent. In Great Britain from 1916 to 1959, the rate of cancer of the lung increased from approximately 10 per 100,000 population to 120 per 100,000 population, and during the same period the rate of all other types of cancer decreased from 280 per 100,000 population to 125 per 100,000 population.[2] In fact, from 1920 to 1954 the incidence of cancer of the lung increased 38-fold in England.[3] In Denmark it increased from 4.5 per 100,000 population in 1931 to 86.7 in 1960.[4] In Holland, from 1924 to 1951 it increased in women 10-fold and in men 24-fold.[5]

I was convinced thirty-five years ago of a causal relationship between cigarette smoking and bronchogenic cancer. This conviction was based on a retrospective observation that all my patients with this new disease were heavy

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* The Black Hills Medical Seminar, presented at Rapid City, South Dakota, Aug. 6, 7, 1965.

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cigarette smokers. I am aware that biostatisticians criticize such retrospective investigation because it deals with a preselected group — such as patients with cancer of the lung.

To determine whether a causal relationship existed between cigarette smoking and cancer of the lung the American Cancer Society undertook a prospective study under the direction of Hammond and Horn.[6] Twenty-two thousand volunteer workers interviewed approximately 200,000 men between the ages of 50 and 70 years, the ages of patients in which cancer of the lung is encountered. Each man filled out an elaborate questionnaire concerning his smoking habits; that is, what he smoked, how much he smoked, how long he had smoked, and if he had ever discontinued smoking. These questionnaires were filed at the American Cancer Society Headquarters in New York. Each year for seven years the interviewers reinterviewed the same men whom they had interviewed previously. At the end of seven years approximately 12,000 of the men had died. Whenever a man died, the volunteer worker obtained a phostostat of the death certificate, and if he had died of cancer and necropsy or biopsy had been performed, the section was sent to the American Cancer Society. This study showed that there is a definite relationship between cigarette smoking and the incidence of cancer of the lung. The rate per 100,000 population in non-smokers was 3.4, in cigarette smokers 78.6, in cigar smokers 11.4, and in pipe smokers 28.9. The rate differed not only according to the smoking habits but also according to the number of cigarettes smoked; that is, in non-smokers it was 3.4; in those who smoked less than one half package of cigarettes a day, 51.4; one-half to one package, 59.3; 1 to 2 packages 143.9; and more than two packages, 217.3. The study further showed that if one discontinued smoking, the chances of cancer developing decreased in proportion to the time that had elapsed since he discontinued. Among those who smoked less than one package a day but continued smoking, the incidence of cancer of the lung was 57.6; in those who smoked less than one package a day but had discontinued for less than ten years, 35.5; in those who had discontinued for more than ten years, 8.3; in those who smoked more than one package a day and continued smoking, 157.1; in those who had discontinued for less than ten years, 77.6; and in those who had discontinued for more than ten years, 60.5. The American Cancer Society Study showed that the death rate from all causes was 105% higher among cigarette smokers than among non-smokers; that the death rate from coronary heart disease was 115% higher among cigarette smokers than among non-smokers; and that the death rate from bronchogenic cancer was 800% higher among cigarette smokers than among non-smokers.[7]

Eight prospective studies have been conducted in the same manner as was The American Cancer Society Study so that approximately 2,000,000 people have been interviewed, and the results of all the studies have been the same. A study of cancer of the lung among physicians in England, made by Doll and Hill,[8] showed that the rate per 100,000 population in non-smokers was 7; in pipe-smokers, 38; in pipe and cigarette smokers, 68; and in cigarette smokers, 125. Moreover, this rate depended on the amount that was smoked. In non-smokers it was 7; in those who smoked up to 15 cigarettes a day, 47; in those who smoked 15 to 24 cigarettes a day, 86; and in those who smoked more than 25 cigarettes a day, 166. If one discontinued smoking, his chances of getting cancer of the lung became progressively smaller as the time since discontinuance lengthened; in non-smokers it was 7; in those who continued smoking, 103; in those who had discontinued for less than ten years, 59; and in those who had discontinued for more than ten years, 35.

Cancer of the lung is increasing in women, and the rate is dependent on the amount they smoke. Haenszel and Taeuber[9] found that the rate in non-smokers was 9.4 whereas in those who smoked more than one package of cigarettes it was 101.4.

Lombard[10] showed that the age at which smoking is begun also influences the development of cancer. In those who began smoking after the age of 20 years, the rate per 100,000 population was approximately 28, in those who began smoking between 15 and 19 years, it was 45, in those who began smoking between 10 and 14 years, it was 80, and in those who began smoking before the age of 10, it was 140. Probably the highest incidence in those who began smoking before the age of 10 years is due to two factors. First, by the time they had reached the age of 20 years, their bronchial mucosa had sustained damage for ten years, and secondly, the bronchial mucosa is more susceptible at a younger age.

It has been shown that microscopic changes in the bronchi vary according to the amount of cigarettes smoked. In our own laboratory Costilow and Carrera[11] showed that changes in

the bronchial mucosa varied according to the amount smoked from completely normal mucosa in the non-smoker to precancerous and early invasive cancer in the heavy smoker. This work has subsequently been conclusively confirmed by Auerbach and associates.[12-14] In an extensive anatomic investigation of persons on whom necropsy was performed they observed that the percentage of slides with atypical cells in non-smokers was 3.8; in occasional smokers, 10.9; in those who smoked as little as ½ package of cigarettes a day, 90.6; and in those who smoked more than 2 packages a day, 99.6. The incidence of carcinoma in situ was as follows: non-smokers 0, occasional smokers 0, those who smoked less than ½ package a day 0.3%, ½ to one package 0.8%, and those who smoked more than 2 packages 11.4%. This work, which conclusively showed that progressive changes increase in the tracheobronchial tree according to the amount smoked, is the most convincing evidence of the causal relationship between cigarette smoking and bronchogenic cancer.

Further evidence of this causal relationship is demonstration of a carcinogen in the smoke of cigarettes.[15-16] Using a robot smoking machine, which smoked 125 cigarettes just as a human would, Wyndner and associates[14, 15] obtained a tar residue from cigarette smoke which, when added to a solvent and applied three times a week to the skin of animals, caused, at the end of eight months, one benign tumor at the site of application of the cigarette tar and at the end of one year one true cancerous lesion which is identical with human cancer in that it metastasized and killed the animal. At the end of two years, in 44 per cent of the animals, true cancers developed at the site of application of the tar. In the control group to which only the solvent had been applied no benign or malignant tumor developed at the end of two years. Bock et al.[17] repeated these experiments and obtained even more conclusive results.

I am frequently asked if cigarette filters are of any value, and I always answer that they are; they help sell more cigarettes. In an investigation which we made comparing the amount of tar residue obtained from smoking different types of cigarettes, we found practically no difference in the amount of tar from cigarettes with and without filters.

The increased incidence of bronchogenic cancer parallels, although it is followed by a lapse of about 20 years, the sale of cigarettes. Whereas, the annual per capita consumption in all persons 15 years of age and older in the United States was only 16 in 1880, and 139 in 1910, it increased progressively after the first World War until it reached a peak in 1953 of 3,545.

It is astonishing that life insurance companies did not, until recently, recognize the causal relationship between cigarette smoking and cancer of the lung. They increase the premiums for the obese, and rightly so, because their death from cardiovascular disease is 1.42 times greater than it is in others, and yet they disregarded the fact that the death rate from cancer of the lung alone is eight times greater in cigarette smokers than in non-smokers. Moreover, there is a tremendously increased death rate among cigarette smokers from heart disease, emphysema, and peptic ulcer. The death rate from coronary disease is three times greater in persons who have smoked a package of cigarettes a day since the age of 21 years than it is in non-smokers. Life insurance statistics show that the life expectancy of a person 50 years of age who has never smoked is 8½ years longer than that of one the same age who has smoked a package of cigarettes a day since he was 21 years old. Dr. Linus Pauling, an eminent scientist and the only man to have won the Nobel prize twice, determined that for every cigarette one smokes he shortens his life 14.4 minutes! As Michel D. Montaigne (1533-1592) stated, "Men do not usually die; they kill themselves."

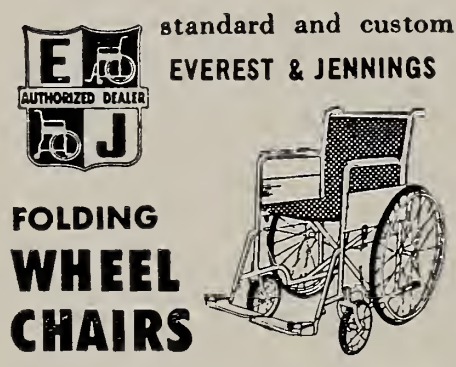
I have come to realize that the most important diagnostic criterion in bronchogenic cancer is the history of smoking and that a lesion of the lung that may be cancer in a person who has never smoked is either adenocarcinoma, which is extremely rare, or is not cancer, and conversely, that if the patient is a cigarette smoker the lesion is probably cancer. I am so convinced of the causal relationship between cigarette smoking and cancer of the lung that I believe that the person who smokes a package or more of cigarettes a day must have a roentgenogram of his chest and cytologic examination of his sputum every three months, and probably a bronchoscopic examination as well, because only in this way can a diagnosis be made at a time when the condition might be curable. One of the reasons that the prognosis in bronchogenic cancer is so bad is because of early invasion of the vascular system by the lesion. Dr. Hurst Hatch, Director of our Pulmonary Function Laboratory, has observed neoplastic cells in the peripheral blood of 40 per cent of patients with bronchogenic cancer examined in the labora-

tory. In those whose lesions were located in the hilar area, the incidence was 30 per cent, whereas in those with peripheral lesions, the incidence was 70 per cent.

In conclusion, it becomes evident from the foregoing discussion that bronchogenic cancer poses an increasing menace. Since the prognosis is poor and the disease is almost always preventable, it behooves us to strengthen our campaign against the deleterious effects of cigarette smoking.

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Dearth of New Drugs Is No Coincidence

. . . New drugs are now fewer in number, slower in coming, and more costly than ever to produce. It is no coincidence, in my opinion, that the number of new single chemical entities introduced in the U. S. prescription pharmaceutical market has fallen from a high of 63 in 1959 to 18 in 1963, and finally to 17 in 1964. This year, for the first time since 1959, it appears that there will be an increase in new products. The number of new drugs approved so far this year is 17. You will note that 1959 just happened to mark the beginning of the Kefauver investigation. — C. Joseph Stetler to Southern Medical Asscciation, October 31, 1965.

The Cost of No Cancer Cure

If any one group of people, whether it be industry or Government, ever started directing all the research, research would be dead. It may sound as if there is some duplication, but it is duplication of objective, rather than duplication of work. If, for example, three companies are working on the solution of the cancer problem, it is likely that each will be using a different approach to the solution. It is true that the research will cost three times as much, but there will be three times as many chances to solve the problem . . . I'd rather pass on to the consumer the cost of the cancer cure than to pass on to the consumer the cost of no cancer cure. — Dr. Thomas F. Carney in broadcast over radio station WBBM, Chicago, December 7, 1965.

IDIOPATHIC PULMONARY HEMOSIDEROSIS*

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Pulmonary hemosiderosis is a disease of unknown etiology and is considered to be uncommon in children and rare in adults. The entity was first described in 1851, but it was not until 80 years later, in 1931, that Ceelen published the first clinical report. In 1944, Waldenstrom presented clinical, roentgenologic, and pathologic correlations and Wyllie, et al., in 1948, published a review of the subject. In a recent survey by Soergel, twelve authenticated adult cases were culled from the literature. By 1957, approximately 65 cases had been reported in the entire literature, only 12 of which had been found in adults. In 1958, Smith and Feinberg reported only the second case to occur in an adult over 30 years of age and in 1959 Gurewich and Thomas reported the seventh case in the literature in an adult over 20 years of age. In a report published in May, 1965, Duncan et al. referred to Goodpasture's syndrome, adding to the literature six patients with associated pulmonary hemorrhage and glomerulonephritis. Since the initial description by Goodpasture in 1919, 98 such cases have been reported. Five of Duncan's patients succumbed to their illness within a few months.[3, 4, 5, 7]

The illness is a disease process characterized by a loss of blood into the alveolar spaces of the lung, often of a sudden and severe degree. It can be fatal initially or it may develop into chronic or recurrent episodes of pulmonary hemosiderosis and fibrosis, cor pulmonale, recurrent anemia and death in a large percentage of cases.[2]

Following are case reports of two patients with proven idiopathic pulmonary hemosiderosis, both currently under therapy in Aberdeen, South Dakota.

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* Presented at South Dakota Regional Meeting of the American College of Physicians, University of South Dakota, School of Medicine, Vermillion, South Dakota, September 24, 1965.

CASE #1

The first patient, L. T., a 39 year old male was first seen on April 12, 1965, at which time he stated that he had noted onset of aching in his legs below the knees two weeks previously. The ankles had been tender and particularly painful and some swelling, as well as increased warmth of the skin, had been noted about the ankles. Twenty-five to twenty-eight pounds of weight loss had occurred in the two to three weeks prior to the initial examination. Weakness had been marked during the week prior to examination and cold intolerance had been prominent during the present illness only. There was no history of polyuria or of polydypsia.

Review of the patient's past history revealed that he had had a seventy-five percent gastric resection in 1954 because of duodenal ulcer, and ulcer symptoms had been present for six years prior to that time. Upper gastro-intestinal bleeding had occurred on one occasion only, that having been the passage of one tarry stool in 1952. The patient's weight had been 155 to 160 since surgery.

Further review of systems revealed that a dull, generalized headache had been present with the present illness, but there had been no recent upper respiratory infection. The patient did not complain of palpitation, but did note occasional low substernal pain with swallowing. There was no dyspnea, no exertional chest pain, and no history of orthopnea or of paroxysmal nocturnal dyspnea. An average of 30 cigarettes per day had been used since age sixteen. He did note some chronic cough with production of sputum, but had had no hemoptysis. No dumping symptoms had occurred post-gastrectomy and there was no history of icterus, acholic stool or of dark urine.

Physical examination revealed a cachectic, acutely ill, middle aged male who appeared chronically ill, and in whom generalized muscular wasting was noted which was symmetrical. The face was tanned but the pigmentation stopped at the shirtline and was attributed to driving a truck and to associated light exposure. The patient stated that the pigmentation was no more pronounced than it had been in the past. The patient's blood pressure was 120/70, his pulse 116 beats per minute, height six feet 2½ inches and weight 129 pounds. Pertinent physical findings included a question of scleral icterus. Cardiac examination was negative except for tachycardia. Moderate dullness to percussion was noted, and a few inspiratory ronchi were audible over the right upper lung field. One plus pedal edema was present and all malleoli were tender and slightly warm but no other joints were involved. Vibratory sense was intact. The remainder of the physical examination was unremarkable.

Laboratory data included a hemoglobin of 8.4 gms% with a 72% hematocrit. White count was elevated to 15,800 with a shift to the left and some young RBCs were noted. Sed. rate was 32 m.m. per hour (Cutler). One plus proteinuria and an occas-

ional WBC were present in the urine, which was also positive for urobilinogen. BUN was 6.9 gms%, total protein 5.0 gm% with 2.3 albumin and 2.7 globulin. Fasting blood sugar was 127 mgs%. Total serum bilirubin was 1.6 mgs% of which 1.1 was indirect reacting. The ICD was 124 and SGPT 12 units. Stool specimens were negative for occult blood. PBI was reported as being 2.4 mcg%. Sputum was negative for acid fast bacilli, as were gastric washings. Sputum culture grew coagulase negative staphylococci. On April 19th the hemoglobin was 7.2 gms%, RBC 2.8 million and hematocrit 28%. 2.2% reticulocytes were noted. The MCH was 24.5 m.m., MCHC 25% and MCV 98 c.m. The electrocardiogram was normal and blood cultures sterile. ASTO titer was 1:50. Specimens obtained from the right lung at the time of bronchoscopy grew coliform bacilli and candida. Twenty-four hour urine specimen cultured for acid fast bacilli was negative.

The initial chest x-ray revealed an infiltrate in the right upper lung field with radiolucency scattered throughout, and a necrotic type of pneumonia was suggested with underlying malignancy or tuberculosis considered possibilities. Cholecystogram was performed and the gall bladder was not visualized. Barium enema was negative. Upper gastro-intestinal x-ray revealed a Billroth type 2 gastrectomy with a normal anastomosis. Repeat chest x-ray on April 21st revealed consolidation in the right upper lung to be increased. Proctoscopy revealed a fissure in ano.

Bronchoscopy was performed on April 22, 1965, and a bronchogram of the right main stem bronchus revealed dye to be pooled in the right upper lobe bronchus with mild dilatation of the bronchi to the posterior and apical segments of the right upper lobe. Some early sacculation of the bronchi was apparent and some contrast was noted to drain into a cavity located in the apical segment of the right upper lobe. There was no evidence of a central lesion causing obstruction.

Skin tests for coccidioidomycosis, blastomycosis and histoplasmosis were negative as was PPD, second strength. Papanicolaou studies on material obtained at the time of bronchoscopy revealed no evidence of malignant tumor cells.

On May 3, 1965, a right thoracotomy was performed by W. A. Bormes, M.D., and a firm lesion of the right upper lobe with extension into the superior segment of the right lower lobe was found. Frozen section revealed this lesion to be inflammatory. A right upper lobectomy was performed. The patient had received blood replacement to 12 gms% pre-operatively and estimated blood loss at the time of surgery was 500 cc.

Microscopic examination of the specimen revealed diffuse interstitial fibrosis. Some of the alveolar spaces were identified and contained macrophages with questionable pigment. The fibrotic zones presented diffuse pigmentation. Foreign body reaction with small granulomata were present within and distal to the pigmented zones, but no caseation necrosis was seen. Bronchiectasis was present in addition to the above. Birefringent light demonstrated tan granular pigment in both the fibroblasts, and free in fibrotic zones. No evidence of malignant degeneration was seen in any area. Gomori stain for iron demonstrated the diffuse pigmentation to be hemosiderin positive. The pathologic diagnosis was that of idiopathic pulmonary hemosiderosis.

The patient's postoperative course was uncomplicated and he was discharged on May 12, 1965. He returned to work as a truck driver within several weeks and has had no recurrent symptoms. Cough and hemoptysis have not occurred. He has been on no medication.

CASE #2

The second patient, J. M., age 23, was on active duty in the U. S. Army in January, 1963, when he noted onset of hemoptysis. In August, 1963, he became weak and anemic and bilateral infiltrate on chest x-ray was apparent. Massive hemoptysis occurred in August, 1963, and at that time a complaint of costovertebral pain was noted, particularly following ethanol ingestion. He was hospitalized at Letterman Army Hospital in San Francisco where physical examination revealed his weight to be 125 pounds, blood pressure 130/80 and pulse 84 beats per minute and regular. Complete physical examination was within normal limits.

Urinalysis revealed ten to twelve RBCs per high powered field and no proteinuria was noted in July, 1963. The BUN was 15 mgs%, hemoglobin 6.6 gms%, vital capacity 2.9 liters, Creatinine clearance was 76 c.c. per min., PSP 12% in 15 minutes and 46% in 45 minutes and total serum protein 8.9 gm% of which 7.5 was albumin and 1.4 globulin. CBC was normal except for the anemia. Fungus skin tests were negative and cultures were negative as were studies of the patients clotting mechanism. Kidney biopsy was done and showed a focal proliferative glomerulonephritis.

In September, 1963, the patient was started on Prednisone 30 mgs. daily and within several weeks he had no complaints and felt well except for some ease of fatigueability.

On November 20, 1963, at the time of evaluation at the V.A. Hospital in Minneapolis, Minnesota, the urinalysis revealed a specific gravity of 1.016, 50 to 60 RBCs per high powered field, a trace of albumin as well as 10 to 15 WBCs. Creatinine clearance was 138 cc/minute. CBC was normal with a hemoglobin of 16.1 gms% and reticulocyte count of 1.2%. Sed rate was 4 m.m. per hour. Cephalin flocculation, thymol turbidity, acid phosphatase, bilirubin and protein studies were all within normal limits. BUN was then 20 mgs% and blood sugar 86 mgs%. Transaminase was 11 and BSP 1.5. Sputum culture revealed normal flora. PSP showed 44% excretion in the first 15 minutes with 16% in the second 15 minutes for a total of 60%. Serum iron was 139 mgs% and the iron binding capacity 133. Serum electrolytes were normal.

A diagnosis of idiopathic pulmonary hemosiderosis with associated acute proliferative glomerulonephritis was made and the patient was maintained on Prednisone 30 mgs. tid. Oral iron therapy was also employed between March and November, 1963.

The patient was re-admitted to the V.A. Hospital in Minneapolis in June, 1965, for re-evaluation. A repeat kidney biopsy had also been done in January, 1964, which showed only mild membranous glomerulonephritis. The patient had had no hemoptysis since put on steroids and had been essentially asymptomatic from the summer of 1964 to the summer of 1965. Physical examination was completely normal in June, 1965, and urinalysis was likewise normal with normal urinary sediment and no protein. Specific gravity was 1.027. BUN was 23 mgs%, total serum protein 7.4 mgs% of which 5.0 was albumin. Blood sugar was normal. Urine culture was sterile. Serum Creatinine was 1.1 mgs% and the hemoglobin 14.4 gms% with a normal white count and differential. L.E. prep was negative. A kidney biopsy was repeated and showed normal kidney. Chest x-ray was then normal as well.

The Prednisone was gradually tapered and in April, 1965, the dose had been reduced to 5 mgs. tid and further decrease is continuing gradually. Urinalysis on September 20, 1965, was completely normal.

Significant renal disease associated with idiopathic pulmonary hemosiderosis had not been observed until 1957. Most patients involved were healthy white males in their 20's in whom the initial manifestation was recurrent hemoptysis followed by severe hypochromic anemia. Hematuria was then noted and in most instances azotemia appeared only after four to five months had elapsed. Several of these patients

have died of renal failure within months. In most instances significant pathologic findings were similar and limited to the lungs and kidneys. The lungs show extensive patchy intra-alveolar hemorrhage, alveolar hemosiderosis, focal chronic organizing alveolitis and interstitial pneumonitis. Histopathology of the kidney lesion appeared to be more specific than the changes in the lung. A diffuse necrotizing glomerulonephritis was found and the glomeruli, like the lungs, showed acute, subacute and chronic changes.

Among children reported to have idiopathic pulmonary hemosiderosis, only four have had associated renal changes and these changes were focal in nature. Instances in adults have recently been described with associated significant arteritis or with pulmonary hemorrhage and no hemosiderosis. Another variant of this syndrome was described by Parkin, et al. in 1955 who reported seven patients with subacute glomerulonephritis and necrotizing alveolitis.[5, 7]

Polyarteritis nodosa has occasionally given rise to severe pulmonary hemorrhage or hemosiderosis, or both, in association with glomerulonephritis. A possible relationship between Wegener's granulomatosis and idiopathic pulmonary hemosiderosis has been suggested. Also Zollinger and Hegglin described a patient with Schonlein-Henoch purpura who had nephritis and pulmonary hemosiderosis and others have commented on the relationship between these diseases. These conditions can usually be differentiated on a pathologic basis and evidence of pulmonary disease prior to the onset of azotemia would seem to readily differentiate the pulmonary hemorrhage associated with uremia.

The combination of pulmonary hemorrhage, intermittent course, hemosiderosis with hemosiderophages in the sputum and the delayed appearance of severe and probable specific type of necrotizing glomerulonephritis, the lack of significant hypertension, and the frequent and rapidly fatal outcome seem to make this syndrome unique although, as has been seen, some respond to steroid therapy.

The relationship between the syndrome of pulmonary hemosiderosis with glomerulonephritis and those patients with only idiopathic pulmonary hemosiderosis is uncertain. It is recommended that, particularly in those with renal involvement, corticosteroid therapy be employed as it has been beneficial in the majority of cases in which it has been tried and it should be realized that the mortality of this disease, although high, is not as great as was once thought.

Most authors agree that the acute attack of pulmonary hemosiderosis is precipitated by sudden and severe intra-alveolar hemorrhage; however, the etiology of the disease remains controversial. Consideration has been given to a circulatory defect causing pressure imbalances as well as to the possibility of a defect in the vasomotor control of the lesser circulation with diapedesis of red blood cells. However, evidence substantiating these hypotheses is lacking. An auto-immune sensitivity reaction with a selective reaction on the alveolar walls, a form of hemolytic disease and a primary iron storage disease have all been proposed as possible causes. A favorable response in some cases to splenectomy or to corticosteroid therapy is indirect evidence in favor of the auto-immune etiology.[6]

In summary, two cases of idiopathic pulmonary hemosiderosis (one with associated glomerulonephritis, and one without) have been presented. Both patients have survived and have no current evidence of their disease. Presentation of these cases has seemed pertinent in that reported instances of this recently described entity in adults have been rare, and the bleak outlook formerly prevalent may be unnecessary with the availability of corticosteroids. The favorable response to steroids also emphasizes the possible auto-immune origin of the disease although the pathogenesis may not be the same in all cases.

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HUMAN SALMONELLA TYPHIMURIUM

Roscoe E. Dean, M.D.
Wessington Springs, South Dakota

AUTHOR'S NOTE: I have written this rather unconventional article to call attention to a disease that may not be diagnosed as often as it should.

On November 19, 1962, I received a phone call from Mr. Ben Diamond, Chief of the State Health Laboratory in Pierre. His call probably saved the lives of three babies and shortened the convalescence for several others. Mr. Diamond reported that the stool specimen from a critically ill child in our hospital contained Salmonella typhimurium.

The fact that we had salmonella in our hospital was both good and bad news. We had been battling a small epidemic which obviously was spreading through the pediatric ward. It was a relief to know what we were fighting.

The children had an illness characterized by very high fever, meningismus, diarrhea and broncho-pneumonia that was unaffected in any way by the usual antibiotics. We had given up all hope of determining which child brought us the disease, or whether several had come in with it at the same time.

When Mr. Diamond called, a frantic mother and grandmother were in my office. Their child had been hospitalized about ten days previously because of a mild respiratory infection. The child had improved and was discharged after several days. (While in the hospital, the little fellow had been in the same room with the child who had produced the stool positive for salmonella.) After one day at home he became severely ill and was re-admitted. In spite of conventional antibiotics, oxygen, etc., the child was getting steadily worse and the parents were frantic. It was, therefore, a relief to be able to tell the mother that we knew what the disease was and that with specific medication we should be able to control it.

At the time, we had five babies in the hospital under the age of two years — all with the same disease. To make things more interesting, a baby in the nursery developed diarrhea. In spite of all our efforts to keep calm, the word was out that there was a mysterious disease "at the hospital," and the new mother became hysterical. Fortunately, the newborn did not have salmonella.

All the salmonella cases recovered on Chloromycetin, gamma globulin and oxygen.

We treated twenty-one cases, in all, over a period of three months. Most of them came from families of construction workers on the Big Bend Dam. We suspect that about six children got the disease in the hospital.

One custodial case, a ninety-four year old lady, developed a positive stool specimen at this time with fever, diarrhea, etc.

As far as we could determine, all of our employees remained healthy. We got stool specimens from several. We kept everyone except essential employees out of the kitchen and set up a very strict isolation technique for dishes, laundry, etc.

The following is the case history of the first child with a positive stool specimen. The second and third case histories are of children who almost certainly contracted the disease in the hospital.

CASE #1: A 10 month old, white, male child; the son of intelligent, economically independent parents, was admitted to the hospital on November 7, 1962. The child was well nourished and had been in good health until about three days before admission when he developed diarrhea, fever, and was very irritable. He would vomit occasionally, but took fluids readily and was not dehydrated. On admission, the temperature was 103 rectally. Grunty respiration and rales could be heard over both bronchial trees. The skin was blotchy and the child seemed to be in pain when handled. He had meningismus. The wbc was 19,700; hbg 11.3; segs 52; lymphs 42. Urinalysis was negative. Clinically, the child had pneumonia, but an x-ray was not taken until the 20th — when it was read as showing bronchopneumonia. The abdomen was rigid and slightly distended. The child was placed in oxygen and started on penicillin every three hours, Polymagma qid, and Panalba qid. He also received several shots of gamma globulin. The child improved and we decided that his problem had been bronchopneumonia complicated by gastro-enteritis. But, on November 16th he again became critically ill with a temperature of 106, and appeared to be in extremus, in spite of a large dose of antibiotics, etc.

A stool specimen was sent to the State Health Laboratory on November 16th, and on November 19th Mr. Diamond called with the information that the

child had salmonella. He was immediately started on Chloromycetin palmitate, two teaspoons qid. It is recorded that on the 22nd he had four loose stools, but the temperature was down to normal from 102 the morning of the 21st. The nurse's notes read, "soft formed stools, ate some applesauce, took fluids well." On the 23rd the child had 2 brownish stools, with temperature normal.

In our experience, Chloromycetin has proved to be absolutely specific for salmonella type infections. Other antibiotics should not be used, even in the presence of pneumonia, because we did have some trouble with thrush in babies we overtreated.

In no case did the Chloromycetin depress the white count seriously, but all babies on Chloromycetin did get daily white counts. The Chloromycetin dose was reduced just as early as possible and discontinued after about 10 days.

CASE #2: A fifteen month old, white boy was admitted with a respiratory infection on November 10, 1962. Because of crowded conditions, he was placed in the room with Case #1. He improved and left the hospital but had to be readmitted the next day because of high fever, diarrhea and clinical evidence of bronchopneumonia. His wbc was 13,750 with 58 segs, 34 lymphs, 6 bands and 2 basophiles. The child's temperature rapidly rose to 106 in spite of penicillin, Panalba, Kaopectate, oxygen and gamma globulin. The nurse's notes read that the child had diarrhea with large amounts of mucus in the stool. One day after Chloromycetin was started the temperature was normal. The child was taken out of oxygen and three days later he had normal stools.

CASE #3: A one year old, white boy admitted on November 13, 1962. He was admitted with a respiratory infection. While in the hospital he developed diarrhea and pneumonia. He was extremely toxic with a temperature spiking to 106 in spite of massive doses of antibiotics. On the day he was placed on Chloromycetin, he had four green stools with blood and mucus mixed with fecal matter. The next day the stools were formed. We never did get a positive stool on this child, but there is no question that he also had salmonella. His wbc ranged from 14,000 to 22,000.

SUMMARY

In November and December, 1962, and January, 1963, we treated 21 cases of salmonosis in Wessington Springs. A number of our cases came from a camp near Fort Thompson, where Big Bend Dam workers lived.

All of our cases had diarrhea, and were very toxic. Several had bronchopneumonia. All had high white counts. Most of the children received their medication orally. There was some vomiting, but it was not a big factor.

A full-blown case of salmonosis in a pediatric ward is a real danger to other patients. We expect that several babies contracted the disease in our hospital before we realized that we had salmonella cases on our hands. It is probably a lot more common than is generally believed. The disease apparently is easily spread and is a real hazard in a crowded pediatric ward, but an epidemic can be controlled with good isolation technique.

During this rather hectic time we depended a great deal on Ben Diamond and his staff. Several times stool specimens were taken to Pierre by car, and Ben personally helped us evenings and Sundays.

We sincerely feel that we owe him a deep debt of gratitude.

SOME TECHNICAL ASPECTS OF SALMONELLA INFECTION

Ben Diamond
State Health Laboratory
Pierre, South Dakota

Salmonella typhimurium is the most common serotype isolated from humans in the United States, as well as other countries throughout the world. During the month of June, 1965, it accounted for 36.2% of all salmonellae isolated.

It is also the most common serotype isolated from non-human sources, 27.6%; with turkeys leading the species involved, 21.3%.

Fortunately, in South Dakota, it has never reached epidemic proportions, except for the possible related cases reported from Wessington Springs. Those identified have been sporadic, with one or two at most family-associated infections or carrier states.

Besides direct infection from animals, rodents, poultry, or a family associated carrier, the organism has been recovered from many foods and food products. Contaminated eggs, or foods containing this ingredient, are often incriminated.

The bacteria appear in the stool early in the course of the disease along with the diarrhea symptoms, and can be readily isolated and identified. Negative stool cultures may result with concomitant antibiotic therapy.

Serological tests are of limited value because of the multiplicity of serological types, their antigenic crosses, the anamnestic reaction as a result of previous infection or immunizations, the delay in the appearance of antibodies, and the low antibody titers often associated with the food-borne types of salmonellae.

Stool specimens should always be examined during the diarrhea/cramping course of the disease which is present in 85% of the patients.

Suspected human carriers require a series of stool specimens to eliminate or confirm the carrier state.

For the first six months in 1965, fifteen isolations or identifications of salmonellae were made in the South Dakota Division of Laboratories, of which ten were **Salmonella typhimurium.** For the United States, 2,174 salmonellae were reported for the month of June 1965 only.

Path C A P sule

Submitted by the College of American Pathology in connection with the South Dakota Society of Pathologists.

ENZYME STUDIES USEFUL IN SUSPECTED MYOCARDIAL INFARCTION

INTRODUCTION

In the past decade there has been a rapid acceptance of serum enzyme determinations in establishing diagnoses. Particular interest has been focused on those enzyme determinations that are helpful in diagnosing myocardial infarction. Among serum enzymes which are elevated following myocardial infarction are:

1. **Serum glutamic oxaloacetic transaminase (SGOT).**
2. **Serum lactic dehydrogenase (LDH).**
3. **Serum creatine phosphokinase (CPK).**
4. **Alpha-hydroxybutyrate dehydrogenase (SHBD).**

Each of the enzymatic tests has some degree of advantage over the others, and for intelligent utilization these advantages should be appreciated.

SGOT

The normal range, which depends in part upon the method used, must be established in each laboratory. A typical normal range is 10-40 units/ml. The value does not vary diurnally from day to day nor is it altered by meals or moderate exercise. After a myocardial infarct an increase is detectable as early as six hours, the maximum value (up to 1500 units/ml.) is reached after 18-36 hours and values usually return to normal 4-8 days after the onset. The rise is related to the volume of necrotic tissue. In general, the larger the infarct the higher the elevation and the more prolonged the period during which SGOT is elevated. Pulmonary embolism usually does not give rise to an elevated SGOT. When pulmonary embolism is associated with prolonged and severe shock, a moderate and delayed rise occurs. The value usually does not exceed 75 units/ml. In myocardial infarction with shock comparable to that occurring in pulmonary embolism values above 200 units/ml. are usual and occur within the first 36 hours after onset. Liver disease and sometimes acute pancreatitis cause an elevated SGOT.

LDH

The main advantage of doing this determination is that the elevation is of longer duration (7-10 days) than SGOT (4-8 days). An increase in LDH occurs 12-18 hours from onset and is maximal 24-72 hours later reaching 500-3000 units/ml. A typical normal range is 150-400 units/ml. Its main disadvantage is the number of diseases that cause it to rise: leukemias, lymphomas, carcinoma, late pregnancy, pancreatitis, and hepatitis. Only a slight elevation follows pulmonary infarction and there is usually no rise in cardiac failure due to causes other than ischemic heart disease.

CPK

This enzyme is reported to have great specificity in striated muscle (both skeletal and cardiac) and is elevated rapidly after myocardial infarction. The disadvantages are: good laboratory methods are not widely available and it is said that CPK is affected by normal physiologic activity and chronic renal disease.

SHBD

The main advantages are: false negatives are stated to be unusual; it remains elevated 10-15 days (sometimes 3 weeks). Disadvantages: it is not widely available; it is present in red cells; it is not specific (elevated in blood dyscrasias and liver disease).

LDH ISOENZYMES

It is known that LDH has five components, LD_1 - LD_5. These are separated by means of electrophoresis. Heart damage is associated with an increase in LD_4 and LD_5. In myocardial infarction the pattern may be abnormal although other enzyme findings may be normal. Methods other than electrophoresis are now being used to separate the "heart fraction," such as differential heat separation. The situation is comparable to acid phosphatase and the "prostatic fraction."

DISCUSSION

Estimation of SGOT and the "heart fraction" of LDH at present are the most useful and widely performed enzyme determinations in the diagnosis of myocardial infarction. An elevation of SGOT and the "heart fraction" of LDH are the most specific indices of myocardial necrosis.

Serum enzyme determinations are sometimes diagnostic when the EKG is non-specific or unchanged. Also, serial determinations may show extension of an infarct in the absence of further EKG changes.

(Continued on Page 34)



SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota 57007

January 28, 1966

Mr. Richard C. Erickson
Executive Secretary
South Dakota State Medical Association
711 North Lake Avenue
Sioux Falls, South Dakota

Dear Sir:

I was very pleased to be advised of your generous gift to the Greater State Fund. We are grateful to the alumni, faculty, and other friends, who join together in this annual effort of self help. The Greater State Fund has already proved that the united efforts of many people, helping a little each year as they are able, can indeed make dreams come true.

As one witnesses a Freshmen Class of 1,772 students and a total enrollment of over 4,600, the responsibility weighs heavily but the opportunity is exciting. The Greater State Fund makes it possible for us to come just a little closer to fulfilling our responsibilities and achieving the excellence that is needed. Without the Greater State Fund, many worthwhile programs would be curtailed or eliminated.

Your generous gift is evidence of your continuing interest in our young people, among the finest, and your concern for the kind of a university we are. It is most gratifying that you are willing to join with other members of our college family in helping us to achieve the academic excellence that is our responsibility.

The destiny of South Dakota State University for a long time in the future is being decided now and during the next few months by the Regents of Education and the South Dakota Legislature. Their decisions will be guided to a considerable extent by the expressions of interest and the wishes of our alumni and friends. We are sincerely grateful for your continuing help.

Very truly yours,
H. M. Briggs
President

SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota 57007

January 26, 1966

Mr. Richard C. Erickson
Executive Secretary
South Dakota State Medical Association
711 North Lake Avenue
Sioux Falls, South Dakota 57104

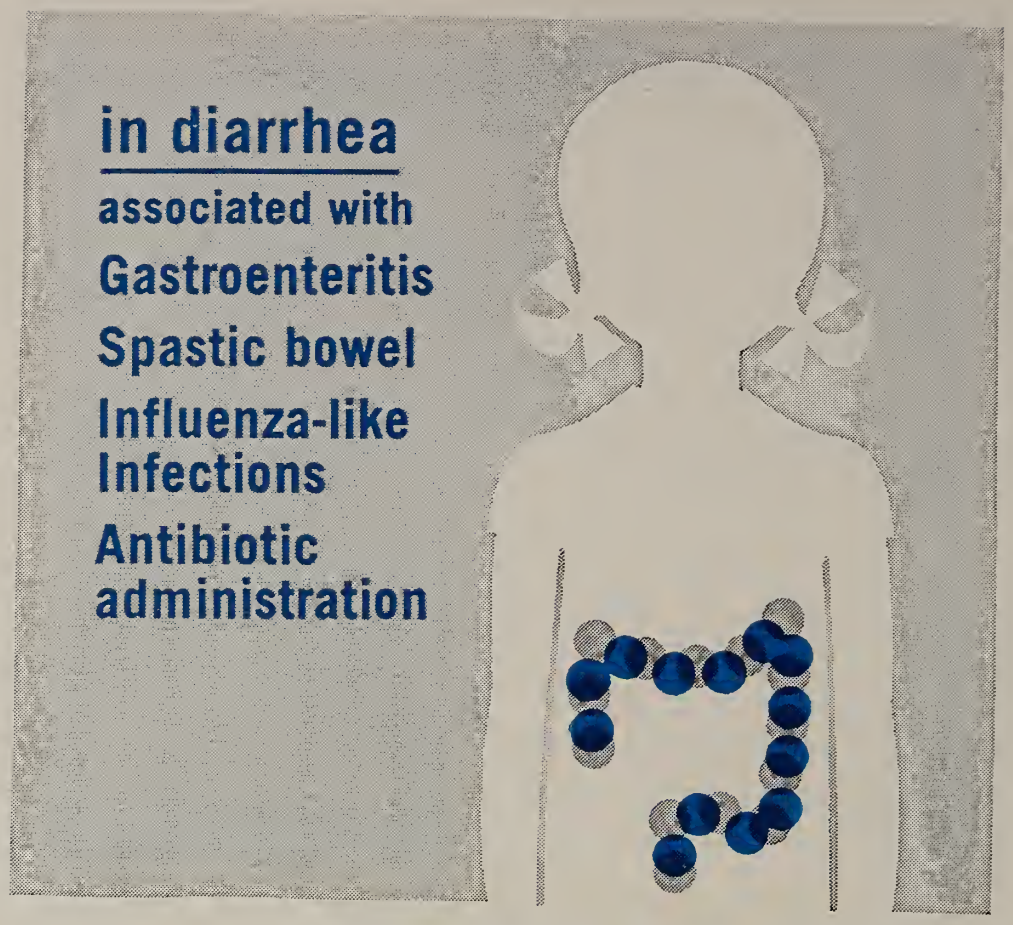
Dear Mr. Erickson:

Professor Carlson has brought to my attention the fact that you have forwarded a donation in the amount of $300.00 to be divided equally in support of the Science Fairs at South Dakota State University, the University of South Dakota, and the School of Mines and Technology.

I want to express to you and your directors and to the entire South Dakota State Medical Association our very deep and sincere thanks for your loyalty and continuing support on behalf of a program which we think is of real significance. I am hopeful that you and members of your directorship and your membership generally might have an opportunity to visit one or more of the Science Fairs. They are quite amazing manifestations of the creativeness and talent of our young people. They are interesting and, if need be, they certainly restore one's faith in young people.

As you know, there are expenses in connection with these Science Fairs that cannot be supported by state funds and therefore, we must continue to depend upon the thoughtfulness and generosity of organizations such as yours. Thanks again from all of us to your wonderful organization.

Sincerely yours,
David F. Pearson
Assistant to the President



normal activity...

promptly...



In children with diarrhea prompt symptomatic control is usually urgently indicated to relieve cramping and to prevent dehydration.

Lomotil halts precipitous progress through the intestines and controls diarrhea with notable promptness, safety and effectiveness.

Experimental evidence[1] has shown that Lomotil is more efficient in this regard than morphine without the latter's manifest disadvantages. In roentgenographic study[2] Lomotil slowed gastrointestinal propulsion within two hours.

At the same time, by diminishing overstimulation of the intestines, Lomotil relieves the abdominal cramps and discomfort so distressing to youngsters.

Lomotil gets children off toast and tea and back to normal diets and normal activity with gratifying celerity.

with LOMOTIL® liquid/tablets

Each tablet and each 5 cc. of liquid contains:
diphenoxylate hydrochloride .....2.5 mg.
(Warning: may be habit forming)
atropine sulfate .....0.025 mg.

Dosage: For full therapeutic effect—Rx full therapeutic dosage. The recommended initial *daily dosages,* given in divided doses, until diarrhea is controlled, are:

Children:

3 to 6 months—3 mg.
(½ tsp* t.i.d.)
6 to 12 months—4 mg.
(½ tsp. q.i.d.)
1 to 2 years—5 mg.
(½ tsp. 5 times daily)
2 to 5 years—6 mg.
(1 tsp. t.i.d.)
5 to 8 years—8 mg.
(1 tsp. q.i.d.)
8 to 12 years—10 mg.
(1 tsp. 5 times daily)

Adults: 20 mg. (2 tsp. 5 times daily or 2 tablets 4 times daily)

*Based on 4 cc. per teaspoonful.

Maintenance dosage may be as low as one fourth the therapeutic dose.

Precautions: Lomotil, brand of diphenoxylate hydrochloride with atropine sulfate, is an exempt narcotic preparation of very low addictive potential. Recommended dosages should not be exceeded. Lomotil should be used with caution in patients with impaired liver function and in patients taking addicting drugs or barbiturates. The subtherapeutic amount of atropine is added to discourage deliberate overdosage.

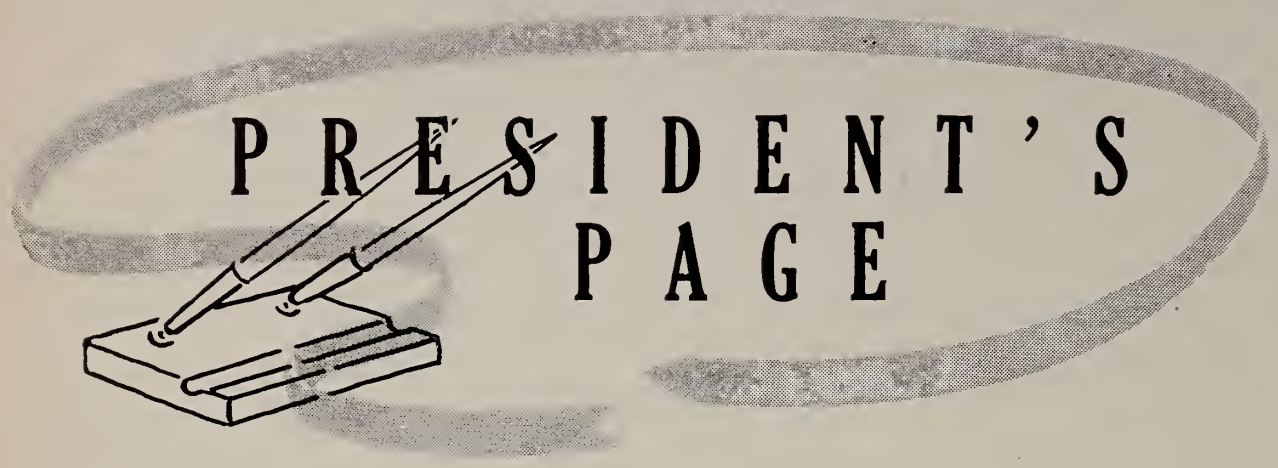
Side Effects: Side effects are relatively uncommon but among those reported are gastrointestinal irritation, sedation, dizziness, cutaneous manifestations, restlessness and insomnia.

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2. Demeulenaere, L.: Action du R 1132 sur le transit gastro-intestinal, Acta Gastroent. Belg. *21*:674-680 (Sept.-Oct.) 1958.

SEARLE

Research in the Service of Medicine



Dear Fellow Doctors:

As we face the problems of Venereal Disease we are confronted with a marked resurgence of the presence of the disease. We had brought the incidence of V.D. down to a new low by 1957, which left us doctors rather apathetic and complacent with the opinion that the problem is solved and that V.D. is near eradication. We find now that such complacency is unwarranted because the incidence of Syphilis and Gonorrhea has increased four-fold in the last eight years. The reappearance of this formidable enemy requires our consolidated efforts for its control and attempted eradication.

We have accurate means of diagnosis and a well stocked armament for treatment of the causative organisms. Yet, in spite of that we have been unable to control the sudden increase of V.D. There needs to be a concerted effort between the patient, doctor and Public Health Department so that the new challenge can be met at the source of its inception.

The large percentage of cases today are seen by the private physician and usually receive adequate treatment. But treatment of the patient without investigation and follow-up of the sources and contacts will not break the chain reaction of the spreading disease. The prevalence will, therefore, increase in spite of our efforts. We, as doctors, must therefore enroll the aid of the Public Health Department to further continue the time consuming effort needed to investigate the sources and contacts so that others having the disease will receive adequate treatment. We must, therefore, of necessity report such findings to the Board of Health or our chances of controlling V.D. are completely inadequate. Such action will leave the problem of diagnosis and treatment to the doctor. By staying out of the personal follow-up care investigations, we leave our patients a better source of help in their family physician loyalty. We must at all times leave an opening for trust and loyalty between the doctor and patient, so as not to create a reluctance in the patient to come for care of the possible presence of V.D.

The doctors' main responsibility should be of diagnosis and treatment, leaving the social and punitive actions to others. This is especially important in the care of our teenagers, who are apt to suffer with the disease in silence, for fear of exposing their source of infection. It is again a requisite that we as doctors rejuvenate a high index of suspicion in findings that may be suggestive of the presence of V.D.

We must enlist the help of the State Board of Health to find the sources and contacts of the disease, so that treatment and attempted eradication can be consummated.

It is ironic that a nation which is on the verge of sending a man to the moon, is having so much difficulty controlling a disease that is over 500 years old, whose causative organism is very well known and for which we have very efficacious drugs.

Sincerely,

Paul Hohm, M.D.
President South Dakota State Medical Association

This is your
MEDICAL ASSOCIATION

News Notes • Changes • Births • News

Pop's Proverb

Jesus Christ would not recognize today's Christianity as anything He started.

NEWS NOTES

The South Dakota Society of Pathologists, at their meeting in Huron, South Dakota, January 8, 1966, elected to three year terms the following officers:

President—
Karl H. Wegner, M.D., Sioux Falls

Vice President—
William D. Sweeny, M.D., Aberdeen

Secretary-Treasurer—
Harold L. Frost, M.D., Rapid City

* * *

Stuart Simon, M.D., Pierre, has been reappointed chairman of the Hughes County Mental Health Board.

* * *

Robert Beckwith, administrator for Chamberlain's Community Bailey Hospital since 1948, has accepted a position with Blue Cross of Des Moines, Iowa. His resignation from the hospital becomes effective March 31st.

A native Australian, now a naturalized American citizen, is Murdo's newest physician.

Dr. James S. Ferguson was accompanied to South Dakota by his son, John, a junior in high school. Dr. and Mrs. Ferguson have eleven children, six of whom are still living at home. Mrs. Ferguson and the remainder of the family plan to join Dr. Ferguson at the end of the school term.

* * *

John W. Argabrite, M.D., Watertown, has been appointed chairman of the Codington County Heart Fund Campaign for 1966. Dr. Argabrite is a past state president of the South Dakota Heart Association, and is presently serving as state chairman of the Long Range Planning Committee.

* * *

Four South Dakota physicians moved into new quarters during the month of January. They are **E. T. Lietzke, M.D.,** Beresford; **Howard Wold, M.D.,** Madison; **George Whitson, M.D.,** Madison; and **Louis Karlen, M.D.,** Madison. The Madison physicians now occupy the Medical Arts Building in Madison.

M. E. Sanders, M.D., Redfield, recently addressed a meeting of the District 13 Nurses Organization. Dr. Sanders spoke to the group concerning the relationship between the medical profession and the clergy, and related subjects.

* * *

New officers of the St. Joseph Hospital medical staff, Mitchell, are as follows:

President—
L. W. Tobin, M.D., Mitchell

Vice President—
Richard Hockett, M.D., Mitchell

Secretary—
J. L. Vose, M.D., Mitchell

Elected to the committee were Drs. W. A. Delaney and Judson Mabee.

* * *

District 11 of the South Dakota Nurses' Association recently heard Walter M. Gysin, M.D., Watertown, discuss "The Mind of the Elderly." Dr. Gysin defined and differentiated between "senile" and "elderly." He stressed that older citizens can contribute much to family, community and world affairs.

Alfred Shousha, M.D., formerly of Hoven, South Dakota, is now associated with **Dr. L. W. Graff** at the Britton Medical Clinic in Britton, South Dakota.

* * *

The Rapid City Symphony boasts four physician members; namely, **Dr. H. L. Ahrlin** — trombone, **Dr. H. H. Theissen** — trumpet, **Dr. G. S. Paulson** — clarinet, and **Dr. Eugene Ittzes** — viola.

* * *

Howard L. Saylor, Jr., M.D., has accepted an appointment by Governor Nils Boe to serve as a member of the State Welfare Commission. Dr. Saylor will fill the unexpired term of Dr. Robert Hayes, who resigned earlier this year.

Members of the Methodist Hospital Auxiliary, Mitchell, South Dakota, recently heard **Dr. Jack Berry** discuss mental retardation.

* * *

Dr. Lowell Philip Swisher, Kadoka, has been elected to active membership in the American Academy of General Practice.

* * *

"Metabolism: Science and Practice in Anesthesia" will be the topic of the Third Annual Midwest Conference of Anesthesiology sponsored by the Illinois Society of Anesthesiologists. The meeting will be held at the Continental Plaza Hotel, Chicago, April 28-30, 1966. For further information and registration, contact T. L. Ashcraft, M.D., 33 East Cedar, Chicago, Illinois, 60611.

South Dakota physicians now have access to unique life-saving equipment through a South Dakota Heart Association grant and the University of South Dakota School of Medicine. The electronic equipment now available includes diagnostic instruments and two cardiac pacemakers for treatment of patients with certain types of heart block. Recipients of the grant are **Warren L. Jones, M.D.** of Sioux Falls, assistant dean of clinical affairs in the School of Medicine; and **Dr. Joseph D. Welty,** assistant professor of physiology.

* * *

M. C. Rousseau, M.D., was elected president of the Watertown Country Club. Elected vice president was **Donald Fedt, M.D.,** also of Watertown.



THE LAND OF INFINITE VARIETY

AND MEDICAL OPPORTUNITY

SOUTH DAKOTA

Numerous Opportunities Available

Small - Middle - Large Town Practice

GENERAL PRACTICE AND ALL SPECIALTIES

JUST ASK US—South Dakota State Medical Association
711 North Lake Avenue
Sioux Falls, S. D.

COUNCIL MEETING MINUTES

Saturday, January 8, 1966

The Inn Motor Hotel, Huron, South Dakota

The meeting was called to order at 5:30 P.M. by **Dr. J. T. Elston,** Chairman of the Council. The following physicians were present for roll call: **Paul Hohm, Preston Brogdon, John J. Stransky, A. P. Reding, G. Robert Bartron, A. J. Tieszen, Fred D. Leigh, Harvard Lewis, E. T. Lietzke, Clark F. Johnson,** and **J. T. Elston.** The following Commission Chairmen were present: **Drs. G. W. Knabe, Jr.; J. B. Gregg; R. H. Quinn; D. L. Scheller; M. R. Cosand,** and **C. L. Vogele.** Also attending the meeting were **Drs. T. H. Sattler** and **Howard Wold.** Mr. Dallas Whaley of the American Medical Association, Field Service Division was also present.

Dr. Hohm moved that the reading of the minutes of the previous meeting be dispensed with inasmuch as they have been mailed to all Councilors and published in the **Journal.** The motion was seconded by Dr. Lietzke and carried.

The first item of Old Business was the consideration of the Articles of Incorporation and Bylaws of the Seventh District Medical Society. Dr. Lietzke moved that the Articles of Incorporation and the revision of the Bylaws of the Seventh District Medical Society be approved by the Council. The motion was seconded by Dr. Stransky and carried.

Dr. Reding discussed the work of the Interprofessional Health Council in relation to chiropractic hospital privileges in county hospitals. He suggested that no legislation be introduced at this time and that additional time be given to the Interprofessional Health Council to work out a solution agreeable to all. Dr. Hohm moved that the report of Dr. Reding be accepted and that the Interprofessional Health Council continue to do what they can in this matter and that the Council be kept informed of their progress. The motion was seconded by Dr. Leigh and carried.

Mr. Erickson commented on the meeting between the Executive Committee of the State Association and the Welfare Commission in December. No action was taken on this matter as it was for the information of the Council.

The Council discussed the formation of the Board of Directors of the South Dakota Medical School Endowment Association under the recently adopted Articles of Incorporation and Bylaws. Dr. Stransky moved that the following physicians be appointed to serve on the Board of Directors of the Endowment Association: **F. R. Williams, M.D.; T. H. Willcockson, M.D.; J. A. Anderson, M.D.; R. C. Jahraus, M.D.; Warren Jones, M.D.; E. T. Lietzke, M.D.;** and **G. E. Tracy, M.D.** Motion was seconded by Dr. Hohm and carried.

Dean Walter L. Hard addressed the Council on the proposed building expansion program of the Medical School at the University of South Dakota. Dr. Gregg read a recommendation from the Commission on Medical Service stating that they would recommend the drafting of a bill to be introduced at the State Legislature, authorizing matching funds for the Federal funds available for this project. Dr. Hohm moved that the executive secretary and the Association's legal counsel draw up a bill to have ready for introduction at the State Legislature; that they consult with Dr. Bartron, proceeding as they see fit if they feel that the bill can succeed. The motion was seconded by Dr. Johnson and carried.

Nominations were submitted for the 1966 Distinguished Service Award. The following individuals were nominated: Watertown District — Mrs. Fish; Yankton District — Mr. Jesse Olson and Mr. Guy Harvey; Dr. Reding — Mrs. C. Rodney Stoltz. A secret ballot was taken and the recipient of this award will be revealed at the annual meeting banquet.

Nominations for the Community Service Award were made. A vote was taken and the recipient of this award will be revealed at the annual meeting banquet.

The Council then considered nominations to serve as Speaker of the House of Delegates to complete the term of Dr. Robert Hayes who is now serving in Viet Nam. Dr. Johnson nominated Dr. James P. Steele of Yankton. Dr. Hohm moved that nominations cease and that a unanimous ballot be cast for Dr. Steele. The motion was seconded by Dr. Lietzke and carried.

Dr. Howard Wold of Madison reported to the Council on the formation of the State Utilization and Insurance Review Committee, and the work they have accomplished to date.

Mr. Erickson discussed the North Central committee to coordinate activities concerning the Heart, Cancer, and Stroke legislation. Dr. Leigh moved that the president of the State Medical Association be designated to serve on the North Central Coordinating Committee for Heart, Cancer, and Stroke. The motion was seconded by Dr. Johnson and carried.

A discussion of the work of the Advisory Committee to Selective Service was held. A request from the State Selective Service headquarters for a fifth member was considered. Dr. Johnson moved that Dr. N. E. Wessman be appointed to serve on this committee. The motion was seconded by Dr. Leigh and carried. Dr. Bartron moved that Dr. G. J. Van Heuvelen be replaced on the Advisory Committee by a practicing physician in the State. The motion was seconded by Dr. Johnson and carried. Dr. C. Rodney Stoltz, Dr. Howard Wold and Dr. Robert Stiehl were nominated to serve on this committee. In a written ballot, Dr. C. Rodney Stoltz of Watertown was selected as the new member of this Advisory Committee.

The Council considered the request of the Blue Shield Board for a feasibility study on usual, customary, and prevailing fees in the State of South Dakota. Dr. Hohm spoke briefly on this subject. Dr. T. H. Sattler also made a short presentation to the Council concerning the proposal. Dr. Stransky moved that the Council give its endorsement to the study. The motion was seconded by Dr. Leigh and carried.

Dr. Elston discussed some problems which have arisen in the Tuberculosis Control Program in South Dakota. No action was taken.

A request to include listings of all bankruptcy actions in the "Grab Bag" was considered. Dr. Bartron suggested that the State Medical Association should not include bankruptcy actions in the "Grab Bag" or **Journal.** Dr. Hohm moved that the letter submitted to the Council be accepted for information only. The motion was seconded by Dr. Lietzke and carried.

The date of the next Council meeting was tentatively set for Saturday, April 2, in Sioux Falls.

Dr. Reding reported that all physicians in the State have received a summary report of the Clinical Meeting of the AMA, held in Philadelphia.

A request for support of the Science Fairs was read. Dr. Reding moved that the State Association contribute the same amount which was given last year ($300.00). The motion was seconded by Dr. Brogdon and carried.

Mr. Erickson requested authorization from the Council to present the new Relative Value Study to the Industrial Commissioner, and to negotiate a dollar co-efficient. Dr. Hohm moved that $5.00 be set as a dollar co-efficient, which will come close to the usual and customary charges in the State; and that anything over this can be referred to the Insurance Review Committee. Dr. Johnson seconded the motion and it was carried.

Dr. Reding submitted the report of the Budget and Audit Committee and presented the proposed budget for 1966-67.

SOUTH DAKOTA STATE MEDICAL ASSOCIATION

INCOME

Item	Budgeted 1965-66	Proposed 1966-67
State Dues	$47,500.00	$47,500.00
Annual meeting	9,000.00	9,000.00
Interest	400.00	400.00
Refunds & Misc.	1,000.00	1,000.00
Car Reimbursement	690.00	$ 1,080.00
	$58,590.00	$58,980.00

EXPENSES

Item	Budgeted 1965-66		Proposed 1966-67
Salary, Exec. Sec.	$ 5,400.00		$ 6,600.00
Salary, Other	11,500.00		10,500.00
Social Security	500.00		700.00
Legal & Audit	650.00		1,200.00
Tele. & Telegraph	1,500.00		1,800.00
Office Supp. & Equip.	2,500.00		2,500.00
Dues & Subscriptions	1,500.00		1,500.00
Officers Travel	2,500.00	Out of	
Physician Travel	2,000.00	State	4,500.00
Annual meeting	7,500.00		8,000.00
Public Relations	4,000.00		3,500.00
Rent	3,000.00		3,000.00
Miscellaneous	100.00		100.00
Postage	1,800.00		2,200.00
Legislative Expense	1,500.00		2,200.00
Benevolent Fund	400.00		400.00
Medical School Endow.	200.00		200.00
Ladies Auxiliary	800.00		800.00
Car Expense	1,800.00		1,100.00
Clinical Pathology	1,000.00		800.00
Staff Travel	4,500.00		4,500.00
Insurance	200.00		100.00
Employment Tax	25.00		25.00
Employee Relations	1,150.00		1,600.00
Reserve	2,,565.00		1,155.00
	$58,590.00		$58,980.00

JOURNAL INCOME

Item	Budgeted 1965-66	Proposed 1966-67
Advertising	$18,000.00	$18,000.00
Subscriptions	1,200.00	1,200.00
Miscellaneous	600.00	600.00
Refunds	200.00	500.00
	$20,000.00	$20,300.00

JOURNAL EXPENSES

Item	Budgeted 1965-66	Proposed 1966-67
Salary, Editor	$ 1,440.00	$ 720.00
Salary, Staff		2,400.00
Legal & Audit	50.00	50.00
Rent	300.00	300.00
Tele. & Telegraph	175.00	175.00
Social Security		100.00
Office Supplies	17,835.00	16,255.00
Postage	200.00	200.00
Travel		100.00
	$20,000.00	$20,300.00

GROUP LIFE INCOME

Item	Budgeted 1965-66	Proposed 1966-67
Premiums	$30,000.00	$30,000.00

GROUP LIFE — EXPENSES

Item	Budgeted 1965-66	Proposed 1966-67
Payment to Insurance Company	$29,100.00	$29,100.00
Postage	50.00	50.00
Legal & Audit	50.00	50.00
Supplies	50.00	50.00
Balance to Surplus	750.00	750.00
	$30,000.00	$30,000.00

AMA DUES — INCOME

Item	Budgeted 1965-66	Proposed 1966-67
Dues Payments from Doctors	$17,000.00	$18,000.00

AMA DUES — EXPENSES

Item	Budgeted 1965-66	Proposed 1966-67
Payments to AMA	$17,000.00	$18,000.00

BUILDING FUND — INCOME

Item	Budgeted 1965-66	Proposed 1966-67
Blue Shield Rent	$ 4,800.00	$ 5,100.00
Association Rent	3,000.00	3,000.00
Journal Rent	300.00	300.00
Bd. of Ex. Rent	300.00	600.00
Nurses Assoc. Rent	900.00	1,080.00
OAA Rent	2,250.00	2,400.00
	$11,550.00	$12,480.00

BUILDING FUND — EXPENSES

Item	Budgeted 1965-66	Proposed 1966-67
Janitor & Repair	$ 1,900.00	$ 2,300.00
Utilities	1,600.00	1,800.00
Interest	2,600.00	2,600.00
Repayment of Loans	2,450.00	2,780.00
Legal & Audit	1,000.00	1,000.00
Taxes & Insurance	2,000.00	2,000.00
	$11,550.00	$12,480.00

Dr. Reding moved that the budget as presented be approved for submission to the House of Delegates at the annual meeting. The motion was seconded by Dr. Lietzke and carried.

Mr. Erickson commented on the status of the proposal by Blue Shield to be designated as carrier for South Dakota under the Medicare Law. He discussed plans for providing space for this program if Blue Shield should be designated as carrier. Dr. Hohm suggested that the executive secretary be authorized to use between five and eight thousand dollars to take care of any remodeling necessary to accommodate the program; that all plans be cleared with the Association's Executive Committee. Dr. Stransky moved that the Council adopt the suggestions made by Dr. Hohm. The motion was seconded by Dr. Brogdon and carried.

A letter from a hospital in the State, requesting a medical audit committee be appointed by the State Association, was read. Dr. Hohm moved that the hospital administration be informed that this matter should be submitted to the District Grievance Committee, and if necessary, it will be referred to the State Association's Grievance Committee. The motion was seconded by Dr. Stransky and carried.

The following resolution from the 4th District Medical Society was considered by the Council:

> The Fourth District proposes that the time limit mentioned in Bulletin #37 of December 16, 1964, of the Joint Commission of Accreditation of Hospitals concerning the emergency room be deleted. The time limit in question specifically refers to the statement in the 3rd paragraph of the above mentioned bulletin stating, "Medical staff coverage should be adequate to insure that an applicant for treatment will be seen by a physician within 15 minutes after arrival." The members of the Fourth District Medical Society propose that the 15 minute time limit be eliminated and that no specific time limit be set forth.
>
> The majority of the applicants to the Emergency Room Department of our hospitals are not true emergencies. It is, therefore, felt that the specific time limit, as set forth and recommended by the Joint Commission, has great medical-legal implications. Also, the specific time limit, as stated, is not qualified concerning emergency and non-

emergency applicants and as to the mechanics of timing.

This proposal does not mean to advocate poor emergency department coverage and it is understood that the specific time limit in question is only a suggestion of the Joint Commission. However, in the past, other suggestions presented in the Bulletins of the Joint Commission have become rules and regulations. Court decisions could be based upon these suggestions. Also, it is felt that with the advent of Medicare and regulations by HEW, the Joint Commission suggestions could most certainly be considered mandatory, thus, making an impractical situation impossible.

THEREFORE, The Fourth District Medical Society of the State of South Dakota Medical Association proposes that the State of South Dakota Medical Association recommend that the Joint Commission remove the time limit in question.

It is hoped by this proposal that, in the future, suggestions made by the Joint Commission be not only concerned with good patient care, but with practicality also in mind.

Dr. Hohm moved that the resolution be adopted and that it be forwarded to the House of Delegates of the American Medical Association, for consideration. The motion was seconded by Dr. Leigh and carried.

Mr. Erickson announced the AMA Meeting to be held in Chicago on January 20 and 21, on Federal Assistance Programs. He indicated that Mr. Randall Tuffs will attend the meeting and asked if a physician on the Council would be able to attend, also. Dr. Brogdon indicated he would be able to go if his schedule permitted.

Dr. Elston discussed the resolution submitted by the Radiological and Pathological Societies:

1. **Whereas**—The practice of Pathology, Radiology, Physiatry and Anesthesiology is the practice of medicine — and —
2. **Whereas**—The services of these physicians can not be considered as hospital services — and —
3. **Whereas**—The Council has adopted the principles and the code of ethics of the College of American Pathologists, American College of Radiology and the American Medical Association as of October 1965 — and —
4. **Whereas**—**Therefore be it resolved** — That any physician not billing separately for professional services or operating under an approved lease arrangement by 1 July 1966 (except as noted in the code of ethics, and policy statements of the American Medical Association and the College of American Pathologists of 1965) be considered practicing unethically and be subject to discipline by the South Dakota State Medical Association.

Dr. Elston moved that the above resolution be tabled. The motion was seconded by Dr. Reding and carried.

Dr. Elston then introduced the following resolution for consideration by the Council:

SOUTH DAKOTA STATE MEDICAL ASSOCIATION

Resolution of the Council

Whereas, radiology and pathology constitute an integral part of the practice of medicine, and radiologists and pathologists are physicians, practicing a specialty in medicine in the same way as surgeons, internists, and other specialists; and

Whereas, radiologists and pathologists in a hospital must be members of the medical staff, with the same qualifications, rights, privileges, duties and responsibilities as other physician members of the medical staff; and

Whereas, any arrangement or contract, under which a radiologist or pathologist, or any other physician pools his professional fee with hospital charges tends to identify that physician as a part of hospital service and places him in the category of a hospital employee; and

Whereas, any such arrangement between hospital and physician conceals from the patient and the public the professional fee of the physician, and the charge of the hospital for facilities, supplies, technical and auxiliary personnel, and the patient has the right to know who is being paid for what; and

Whereas, such a contractual arrangement tends to eliminate competition between physicians based upon proficiency and quality of service to patients, and substitutes competition for hospital contracts based upon a willingness to accept hospital dictated terms, which is a form of solicitation of patients; and

Whereas, inclusion of the professional service of radiologists and pathologists, as hospital services constitutes a serious threat towards the ultimate inclusion of all physician specialists as hospital-based hospital employees; and

Whereas, the House of Delegates of the American Medical Association has on many occasions, stated as a principle that "A physician should not dispose of his professional attainments or services to any hospital, corporation, or lay board by whatever name called, or however organized under terms or conditions which permit the sale of the service of that physician by such agency for a fee;" and

Whereas, Public Law 89-97, Medicare, makes it mandatory that no physician's professional fee be included under the Hospital Service Component, Part A., of the Law; and

Whereas, this necessitates separate billing of radiologists and pathologists professional fees from that of the Hospital Service Component in the radiological and pathological services on Medicare patients; and

Whereas, having a different billing system for Medicare than for non-Medicare patients would result in confusion, and a uniform method of handling all radiological and pathological billing is preferred; and

Whereas, this system of separate billing has been tried and has been in effect in a number of hospitals for years including some university hospitals and has proved itself to be a most satisfactory system; and

Whereas, the American College of Radiology did, on October 1, 1965, adopt the policy of separate billing by radiologists; and

Whereas, on October 3, 1965, the House of Delegates of the American Medical Association adopted this policy of separate billing by all physicians as follows:

"Hospital-based medical specialists are engaged in the practice of medicine. The fees for services of such specialists should not be merged with hospital charges. The charges for the services of such specialists should be established, billed and collected by the medical specialist in the same manner as are the fees of other physicians. The American Medical Association intends to continue vigorously its efforts to prevent inclusion in the future of the professional services of any practicing physician in the hospital service portion of any health care legislation."

Therefore Be It Resolved, that the South Dakota State Medical Association define as unethical and make known its disapproval of any contract or other arrangement whereby a physician merges his professional fee with hospital charges, and further

Be It Resolved, that the charges for the services of hospital-based medical specialists should be established, billed, and collected, by the medical specialists in the same manner as are the fees of other physicians.

After discussion, Dr. Hohm moved the adoption of the resolution with the removal of the phrase "define as unethical and" in the second to the last paragraph. The motion was seconded by Dr. Leigh and carried.

The Council then considered the report of the Commission on Medical Service.

REPORT TO THE COUNCIL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION FROM THE COMMISSION ON MEDICAL SERVICE

There has been no formal meeting of this Commission since August of 1965, the few items of business which did come up having been handled by mail.

The Chairman of the Commission attended the organizational meeting of the Committee on Utilization and Insurance Review on November 17, 1965, at the office of the South Dakota State Medical Association in Sioux Falls.

Dr. Gerald Tracy of Watertown, has several small matters of business for which he plans to call a meeting of the immunization-school health committee of this Commission, soon.

Dr. John Stransky reported for the Committee on Traffic Safety. The Medical Advisory Committee to the Department of Motor Vehicles of this State has had several meetings at Pierre, and is currently in the process of working out a form which will be completed by the family physician in those cases in which the Medical Advisory Board needs further information to evaluate the medical aspects of driver-license applicants. The form is being designed in a manner which will provide the maximum information with the minimum effort as far as the family physician is concerned. It is hoped to have information relating to this form in either the "Grab Bag" or the **Journal** or both prior to the time the form is put into use. The Motor Vehicle Department is in the process of setting up a code which will be used on the back of drivers' licenses to convey pertinent information regarding mental illness, alcoholism, and drug addiction, as it relates to the licensee. The Department is now in the process of working out with the State office the means of conveying this information to physicians throughout the State.

Dr. R. Jahraus reported for the Medical School Advisory Committee that he has corresponded with Dean Walter Hard who may have some specific requests for committee action, depending upon the results of a meeting held in Pierre, in early December. No official action has been forthcoming as of the date of this letter.

Dr. J. A. Anderson reports that there has been no official business for the Committee on Rural Health. Dr. Anderson is tentatively planning to attend a Rural Health Conference at Colorado Springs in March of 1966.

Respectfully submitted,
J. B. Gregg, M.D., Chairman
Commission on Medical Service

In addition to this report the Commission recommends that two scholarships be awarded to a freshman and sophomore student at the University of South Dakota; that a tuition scholarship be awarded in the amount of $450.00. Dr. Stransky moved that these scholarships be given with the stipulation that they be presented to South Dakota students. The motion was seconded by Dr. Johnson and carried.

The report of the Commission on Scientific Medicine was considered and approved.

REPORT OF THE COMMISSION ON SCIENTIFIC MEDICINE

The Commission met on Sunday, Ooctober 10, from 9:00 A.M. to 12:30 P.M. at The Inn in Huron. Present were **Drs. S. W. Fox, E. H. Heinrichs,** and **G. W. Knabe, Jr.,** and Mrs. P. Butler.

1. **Tuberculosis Control Program:** Dr. N. deDianous advised by phone that at the meeting of the South Dakota Tuberculosis and Health Association in Rapid City, October 4, the State Health Officer again indicated the medical association's recommendation would be favorably considered. To implement these recommendations it will be necessary to set standards for the evaluation and treatment centers and develop in detail a plan for operation of the program. The State Health Department hopes to secure legislative action to permit acceptance of federal funds for special tuberculosis control projects. A joint meeting of the Commission and State Health Department is planned for early next spring to discuss these matters. Commission member J. T. Elston, M.D., has referred a problem concerning inability to secure payment from the State Health Department for diagnostic tuberculosis laboratory work performed locally. The matter is under study. Mr. John R. Mullen, of the USPHS, was appointed Program Coordinator, Division of Tuberculosis Control, State Health Department, July 1.

2. **Mental Health and Mental Retardation:** It has been proposed by a subcommittee of the Committee on Health of the Legislative Research Council that a State Commission on Mental Health and Retardation be established compiled of the superintendents of Yankton State Hospital (chairman) and the Redfield Hospital, a physician appointed by SDSMA, and designees of the Association of Mental Health Centers and the Association for the Mentally Retarded. A committee of lawyers and physicians has been appointed to overhaul mental health laws including those pertaining to suicide.

3. **Diabetes:** The Executive Office secured and disseminated publicity information on Diabetes Detection Week to radio, TV, and newspapers. Dr. S. W. Fox has been delegated to form an ad hoc committee to explore the role of SDSMA in cooperating with the American Diabetes Association. Policy will be developed to apply to the November, 1966, drive.

4. **Aging:** G. W. Knabe, Jr., M.D., participated as a presiding officer and discussion group chairman in the AMA-sponsored Conference on Aging and Long-Term Care in Denver, October 7 and 8. The recently signed Older American Act created the Administration on Aging, an agency equal in status to the Public Health Service. About 40 states have created a Council or Commission on Aging to handle forthcoming federal funds to develop comprehensive programs in health and social welfare for aged (65 and above) aging (45 to 65 years) persons. To promote an organized and medically-oriented approach at the state level to this large new program, the Commission recommended that the Council request the Governor to create a Council or Commission on Aging to study problems of the aged in South Dakota and methods for developing programs in this area under provisions of the Older Americans Act. It was further recommended the Council suggest to the Governor a list of appointees to this Commission. The Council, on October 10, moved that such action be taken. A recommended list is being developed.

5. **Heart Disease:** The Chairman of the Commission has received communication from the USPHS offering the medical school a public health officer on assignment to work on Heart Disease Control Activities. Approval from the State Health Officer and the Council of the SDSMA has been obtained although the likelihood of securing such a physician is remote since requisite financial support for his activities would be lacking.

6. **Annual meeting:** December 9th, Dr. Knabe, Mr. Erickson and staff inspected the meeting site at the State Fair Grounds. The report was made to the Huron District #5 Medical Society at which time additional suggestions were obtained concerning arrangements for the meeting.

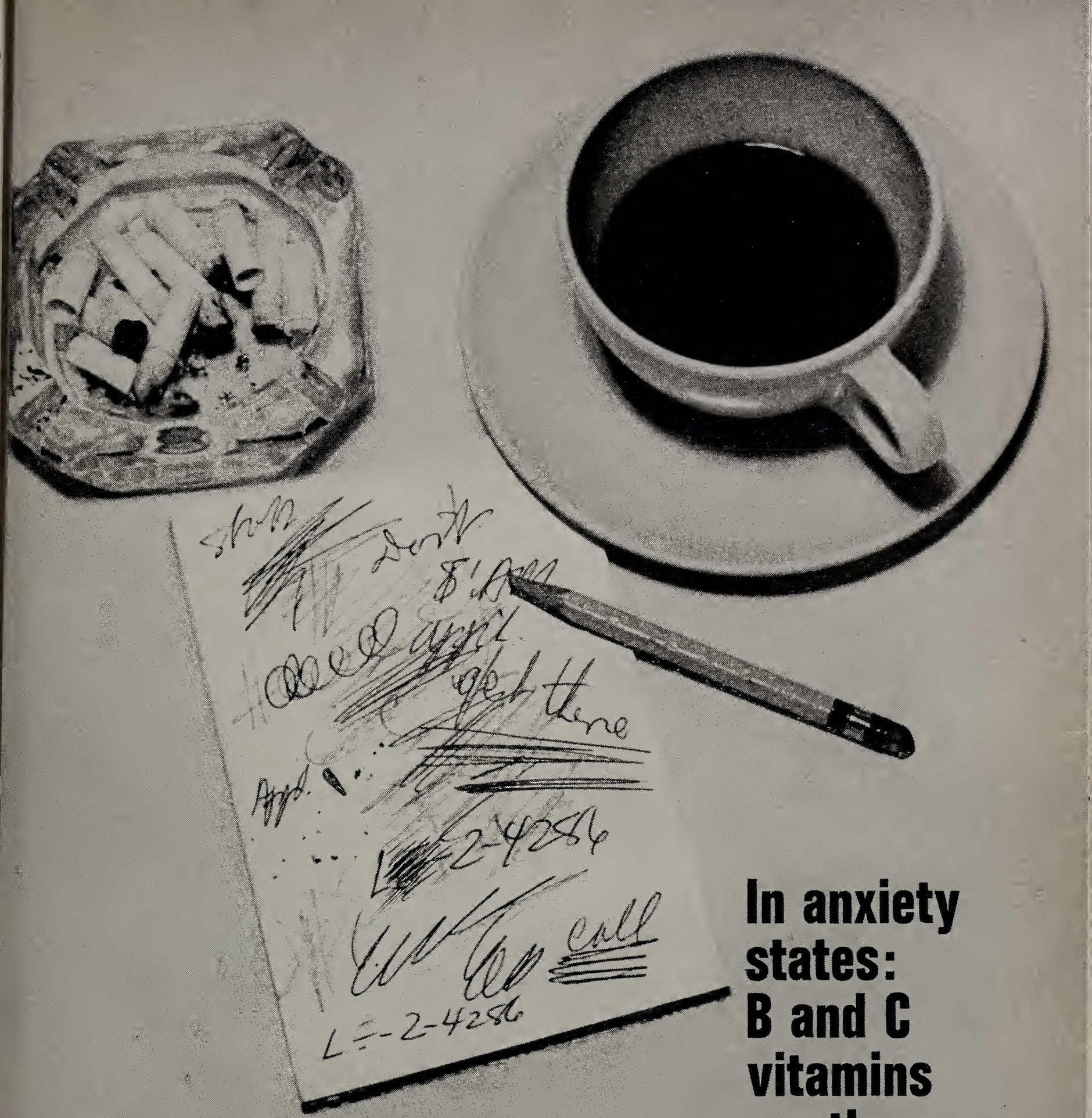
Respectfully submitted,
George W. Knabe, Jr., M.D., Chairman
Commission on Scientific Medicine

There was no report from the Commission on Communication. The Commission on Internal Affairs report on the proposed budget had previously been approved.

Dr. Quinn gave a short verbal report on the work of the Commission on Legislation and Governmental Relations. The bill concerning immunity for liability in the performance of duties as a hospital staff officer will be introduced at the 1966 session of the Legislature. Mr. Erickson explained Senate Bill #10, which sets up a Commission on Mental Health and Mental Retardation.

Dr. Cosand reported on the liaison work with the Pharmaceutical Association and stated the physicians will be receiving a second letter concerning dispensing of drugs in the near future.

The meeting adjourned on motion at 11:00 P.M.



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A Cease Fire on the Regulatory Front?

If the American pharmaceutical industry is to continue to lead the world in productivity and to increase its great investment in the search for ever better, safer drugs . . . the scientific stature of the FDA must be raised . . . The agency and its incoming management must be given a breathing spell to absorb the vast workload it is charged with handling. The Administration and Congress should work together to arrange this breathing spell — a temporary halt to public investigations of the FDA's stewardship — and no new FDA regulatory programs should be enacted during this period. — Walter A. Munns to Medical Society Executives Association, November 30, 1965.

Have You Heard This True Story?

There is a meaty kernel of truth in the story that pharmaceutical companies have to tell to doctors. Some of these companies have developed splendid laboratories for research. They spend millions of dollars a year looking for new drugs. And every year they are finding new drugs, some of which lower mortality rates, shorten illness, prevent disease or make life for the chronically ill more tolerable. The more ethical companies search diligently for the truth about the effects of their drugs and tell doctors plainly what they have found. — Harry F. Dowling, M.D. in **Emory University Quarterly,** (21:98-99), Summer 1965.

"Quick, Watson, the Synthetic Quinine!"

Any possible solution short of restoring normal supply of cinchona bark at reasonable prices seems to lie in three areas: The ability of the American pharmaceutical industry to develop new quinine and quinidine substitutes, success in developing low cost synthetic processing, or finding a new source possibly in this hemisphere, of new cultivated cinchona groves. A real challenge? Of course it is, but American drug makers have quite a reputation for achieving success in the face of near-impossible circumstances. — Rowland B. Kennedy, in **Journal of the Mississippi State Medical Association,** (6:458), December 1965.

Why Not A Trial Prescription?

The samples you get from drug companies are intended for one purpose: to be given to patients as a trial. However, if no written prescription accompanies the sample, the transaction looks like the dispensing of a home remedy; or looks as if the patient is being used as a guinea pig. Common sense suggests that the sample should be accompanied by a written prescription for the same item. — Editorial in the **Journal of Medical Society of New Jersey,** (62:547), December 1965.

What's In A Drug Name?

A few years ago nomenclature purists insisted that drugs be named to indicate their chemical structure . . . We refer to corticosteroids, thiazide diuretics, sympathetic amines, anticholinergics, phenothiazines and anticoagulants but we resort to a contrived word to identify the particular drug we want. We know drugs more by their actions than by their precise chemical structures, which, after all, is the essential information. By analogy, if we know how to operate a motor vehicle competently, it isn't really very important whether or not we know the dimension of the cylinders, its compression ratio or the mechanism of the automatic transmission. — Theodore G. Klumpp, M.D., in **GP,** (32:197-198), November 1965.

PathCAPsule—

(Continued from Page 22)

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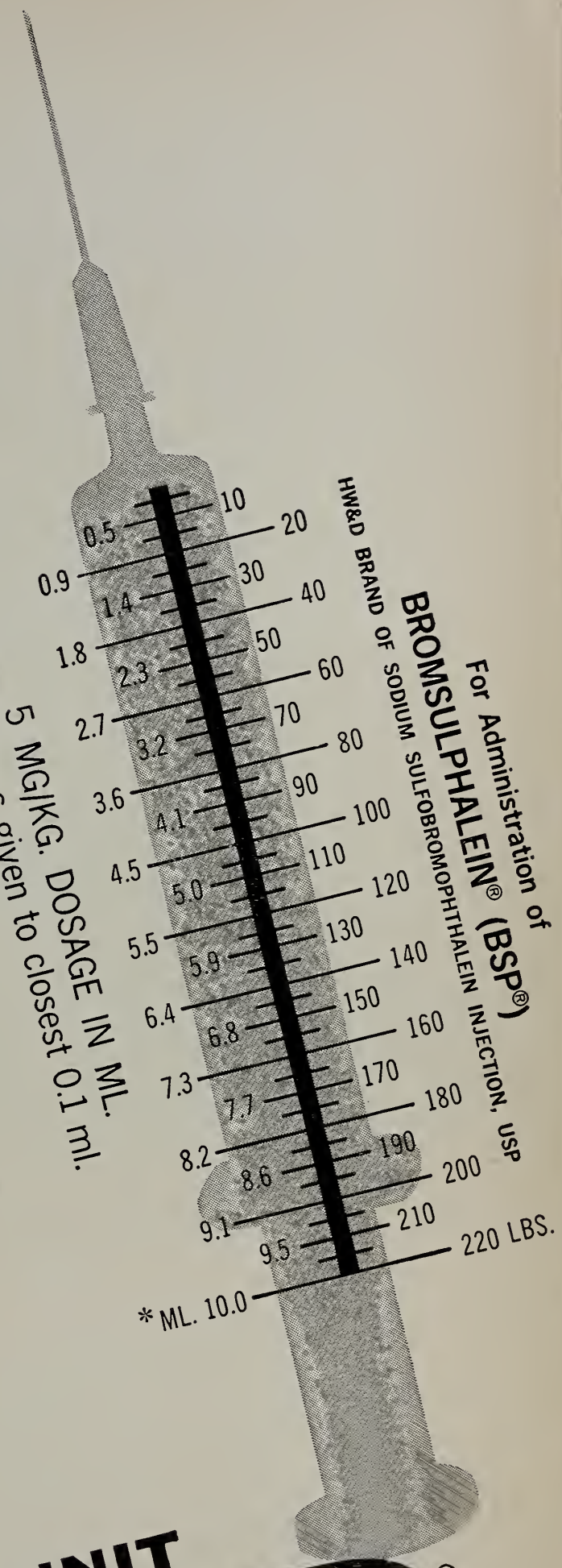
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Volume XIX **April, 1966** **Number 4**

CONTENTS

Gout as a Complication of Oral Diuretic Therapy 13
Everett W. Sanderson, M.D.

A More Vigorous Therapeutic Approach to Chronic Obstructive Airway Disease 19
David E. Dines, M.D.

Abortion in Modern Times: Thoughts and Comments 23
H. B. Munson, M.D.

PathCAPsule — Serum Protein Bound Iodine as a Measure of Thyroid Function 31

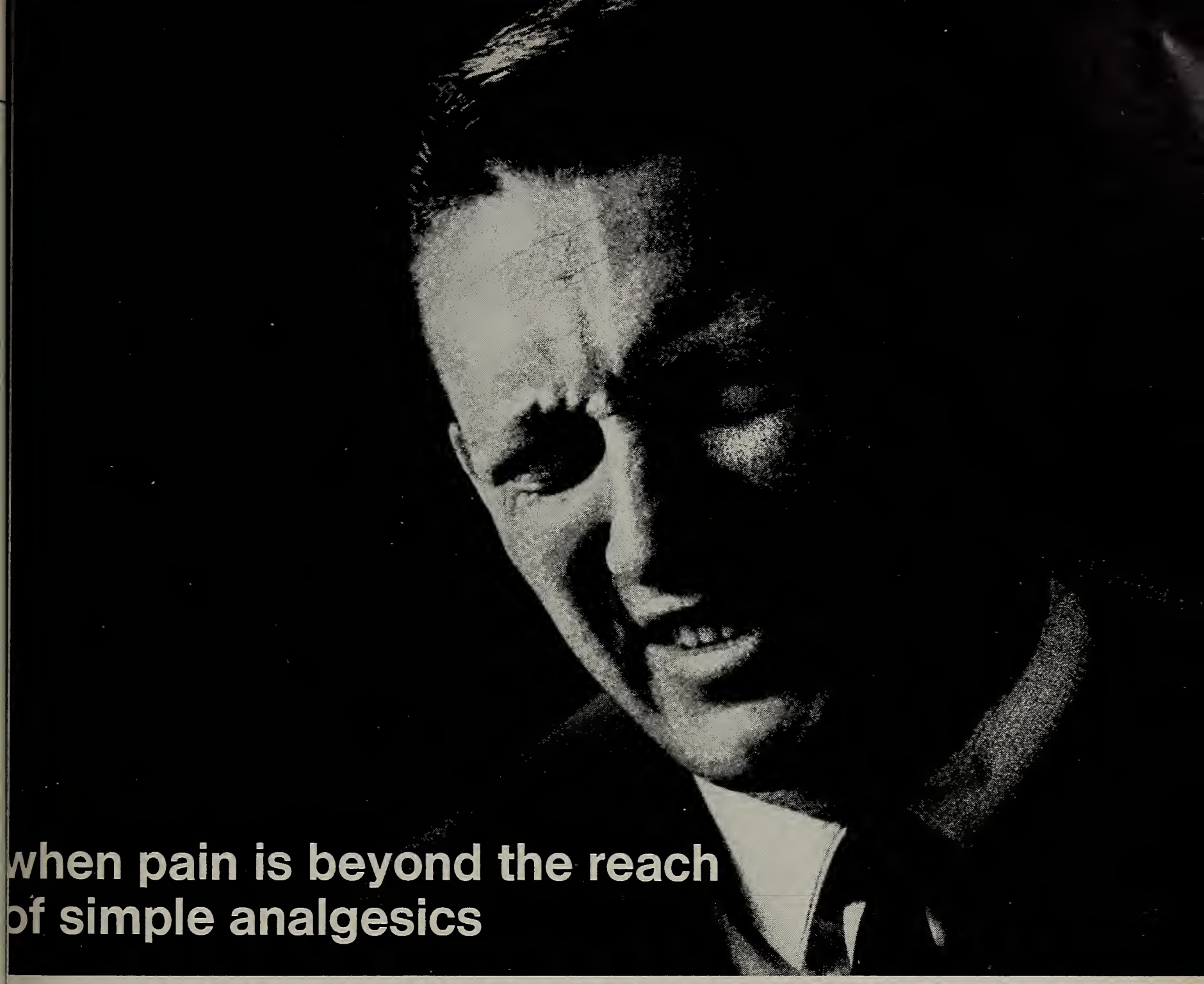
President's Page 33
Paul Hohm, M.D., Huron, S. Dak.

This Is Your Medical Association 34

Letters 35

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1. Collective studies, Department of Medical Research, Winthrop Laboratories.

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GOUT AS A COMPLICATION OF ORAL DIURETIC THERAPY

By

Everett W. Sanderson, M.D.
Sioux Falls, South Dakota

A new class of drugs introduced in 1957, commonly referred to as the "thiazide" diuretics have rapidly become widely prescribed, and an important part of drug therapy. Chlorothiazide was first introduced and was followed by a number of cogeners, all containing a benzothiadiazine radical, in an attempt to improve potency and reduce undesirable side effects. One exception is chlorthalidone, which has a phthalimidine nucleus rather than the benzothiadiazine ring, but commonly included in the general classification as it has a similar pharmacologic action. Another is quinethiazone with a cyclic carbamyl group, but a similar action.

Mechanism of Action: The mechanism of action of chlorothiazide is to promote increased excretion, predominantly of chloride much like a mercurial diuretic rather than excretion of bicarbonate, typical of carbonic anhydrase inhibitors. There must in some manner be decreased tubular reabsorption of sodium. There is also increased potassium excretion by a somewhat complicated mechanism sensitive to the level of aldosterone. Other actions include a direct hypotensive effect in the presence of hypertension and potentiation of other hypotensive drugs; an increase in the specific gravity and reduced urine volume in Diabetes Insipidus.

Side Effects: As with all potent drugs, undesirable side effects complicate their chronic usage. Fortunately, however, these complications are usually not of a critical nature when recognized early, and can be counteracted by proper management of the patient.

The most frequent and important side effect is hypokalemic alkalosis. This accounts for many serious cardiac arrhythmias in digitalized patients. Other symptoms are apathy, drowsiness, anorexia, and extreme weakness, to the point of flaccid paralysis, hyporeflexia, paralytic ileus, hypotension, and shallow respiration. Hypokalemia occurs in about 90% of cases.

Sodium depletion is a much more rare complication and must be differentiated from dilution as withdrawal of the drug and administration of hypertonic salt may correct the former, but be harmful in the latter case.

Hyperglycemia occurs fairly frequently and is most prominent in diabetic and prediabetic individuals, the mechanism appears to be unrelated to the pancreas or kidneys and is actually unknown. These patients respond to standard diabetic care.

Elevation of blood urea nitrogen may occur in patients with renal insufficiency with or without hypertension. Ordinarily thiazides cannot be given to patients with an initial BUN above 40 mg.%.

Less frequent complications include reports of skin rashes, thrombocytopenia, jaundice, impotence, and gastro-intestinal intolerance.

Hyperuricemia has been noted in a high percentage of patients receiving chronic thiazide therapy. In spite of this phenomena, only scattered cases of acute gout have been reported. The first case was reported by Oren and Associates in 1958. This factor has been accepted as a complication of diuretic therapy, including mercurials.

Gout

Primary gout is a disease that predominantly afflicts men. Less than 5% are females. There probably is hereditary transmission of the disease, but secondary gout may alter the ratio considerably and the incidence in females may rise above 50%. Primary disease has been reported from a 5-week-old infant to a first attack in the ninth decade. The vast majority experience the initial attack during the middle years of life.

There are at least three internal dysfunctions that lead to elevated urate levels in the body fluids. 1. Diminished destruction by enzymes. 2. Diminished excretion by kidneys. 3. Increased formation by errors in intermediate metabolism.

Presented at South Dakota Regional Meeting
Of American College of Physicians
24 September 1965
Vermillion, South Dakota

At least in the early stages of the disease, normal renal function as measured by the usual means is the rule. Uric acid is completely filterable at the glomerulus and almost completely reabsorbed at the tubule. The urate appearing at the bladder is of a function of tubular secretion according to Gutman & Yu. Prolonged administration of chlorothiazide produces elevated serum uric acid in the majority of patients. This elevation is not constantly related to glomerulo-filtration rate or filtered load of urate. Following I.V. infusion of chlorothiazide, uricosuria occurs despite a fall in G.F.R. Chronic oral administration is associated with urate retention. It has been postulated that oral administration suppresses tubular secretion of urate, while I.V. administration suppresses reabsorption with increased excretion. These functions are independent of its effect on electrolyte excretion.

Gout is more likely to be precipitated by trauma, surgery, acute infection, blood loss, prolonged bed rest, and drugs, than by food or drink. Parenteral penicillin, thiamine, hydrochloride, B-12, insulin, liver extract + ACTH, and ergotamine tartrate as well as mercurial diuretics, have been known to precipitate attacks. Likewise, gout is not uncommonly associated with diseases such as polycythemia, myeloid leukemia, and myeloid metaplasia, and may be classified as secondary gout.

DIAGNOSIS

The incidence of gout is related to the index of suspicion. It should be suspected in an individual with severe pain in one or more peripheral joints, or of the back, usually of sudden onset. Occasionally tophi may develop without joint symptoms. Albuminuria, hypertension and renal calculi may precede articular symptoms. Sometimes subcutaneous tophi may break down and discharge a urate sludge. Muscular symptoms may be a primary complaint.

The serum uric acid is a valuable aid in diagnosis and is usually elevated during the intercritical period unless uricosuric agents are administered. Unfortunately this biochemical determination is subject to error dependent upon the method and the skill of the technician. Most normal people have a level below 5 mg.% and the gouty individual's level above six. Abnormally high levels may be observed in cases of chronic renal disease, certain poisoning, and ingestion of drugs such as pyrazinamide, and diuretics. The clinical response to therapy with colchicine, and possibly phenylbutazone or allopurinol, may aid in diagnosis, as may the identification of urate crystals from synovial fluid or tophi.

CASE REPORTS

Case Number One

LM — 59 yr. WF had been a known hypertensive for approximately three years and had been taking chlorthalidone which had controlled her hypertension fairly well, however, after being on therapy she developed pains in the arms and shoulders with stiffness in the shoulder joints, and with marked limitation of motion. Serum uric acid taken on 5/4/65 was 8.15 mg.%. She was subsequently hospitalized for orthopedic manipulation and physiotherapy because of the frozen shoulder symptoms. She was placed on ColBenemid and obtained rather dramatic benefit. The chlorthalidone was discontinued and she was changed to a combination of cryptenamine and reserpine. The ColBenemid was discontinued after approximately two weeks of therapy, when the symptoms subsided.

Case Number Two

AL — 67 yr. WF was admitted to the hospital in December 1964 for treatment of an acute coronary occlusion. Shortly thereafter she developed acute arthritic symptoms in her left knee. The serum uric acid was 7 mg.% and she promptly responded to a full course of colchicine therapy. This lady had been a known hypertensive for approximately six years and had been receiving chlorothiazide 500 mg. daily. Incidental to this, she also had mixed arthritis, primarily rheumatoid, with some degenerative changes, and had been receiving prednisone 7½ mg. daily, which normally controlled the arthritic symptoms. Subsequent to the diagnosis of acute gouty arthritis of the knee, the chlorothiazide was discontinued. She was switched to Naturetin 5 mg. daily and was placed on probenecid 250 mg. daily. The blood pressure has been controlled since that time, and she has had no further exacerbations of acute gouty arthritis.

Case Number Three

CDR — 78 yr. WM, known hypertensive for approximately one year prior to examination and had been taking chlorthalidone intermittently since that time, in addition to digitoxin 0.1 mg. daily. He developed intermittent tenderness and pain in the ankles and hands with acute onset and a gradual diminution in symptoms. The serum uric acid was 6.8 mg.%, BUN 27 mg.%. Because his symptoms of acute arthritis were minimal he was continued on previous medications and no uricosuric agents were added. He subsequently was found to have diabetes mellitus (which also could be related to the diuretic therapy), that responded to tolbutamide therapy. During the intervening six months he has had no acute flareups of gout and has tolerated the medication without further incident.

Case Number Four

JF — 64 yr. WF was first found to be hypertensive 15 years previous to the onset of pain in the right foot, that was of subacute onset, and with moderate tenderness and redness. The BUN was 14 mg.% and the serum uric acid, 7.2 mg.%. In recent years she had been taking chlorthalidone ½ tablet daily. After the initial diagnosis of acute gout was made in 1961, she was started on zoxolamine in addition to the antihypertensive medication, and the symptoms gradually subsided. However, the zoxolamine was discontinued after a few months. Subsequently she had to be continued on diuretic therapy because of chronic congestive heart failure, and has had intermittent flareups of acute arthritic symptoms. Uric acid on 4/21/65 was 7.2 mg.% and she was placed on ColBenemid 1 tablet b.i.d. This lady also developed frank diabetes mellitus in June 1965 and has been maintained on tolbutamide 1 tablet b.i.d., which has controlled the blood sugar. Subsequent to being placed on ColBenemid, she has had minimal arthritic symptoms that were attributed to degenerative arthritis.

Case Number Five

PHS — 37 yr. WM who had been a known hypertensive for approximately 8 years, was started on hydrochlorothiazide 50 mg., b.i.d., in 1962, which controlled the hypertension quite well until July 1965, when he developed multiple joint and muscular pains, primarily in the hands and in the right big toe. The muscles were generally sore to touch, and he developed painful muscular symptoms in the buttocks and other large muscle groups. At that time the blood pressure was 140/100. A serum uric acid was 9.8 mg.%. The hydrochlorothiazide was discontinued. He was placed on ColBenemid b.i.d., and combination of cryptenamine and reserpine. The symptoms subsided within a few days and the followup blood pressure was 136/90. The ColBenemid was discontinued after one month of therapy, and he has had no further difficulty.

Case Number Six

LW — 64 yr. WM who was first seen in 1962 with a history of Buergers disease for approximately 22 years. He was hypertensive and was placed on chlorthalidone. Approximately three months later he developed acute gout with a draining sinus at the site of amputation of the right great toe. There was considerable pain and discomfort in the area, and lumbar sympathectomy was contemplated until it was found that the serum uric acid was 10 mg.%. He was given a full course of colchicine therapy and responded quite dramatically. He was placed on ColBenemid one tablet b.i.d., the diuretic was discontinued, and his hypertension was treated with reserpine. The ColBenemid was discontinued later, and the blood pressure has remained within upper limits of normal. On 3/12/65 serum uric acid was 5 mg.% and the patient was essentially asymptomatic.

Case Number Seven

JL — 55 yr. CM who had a history of being hypertensive for approximately 20 years and had been on various medications for control of the hypertension, including reserpine, ganglionic-blocking agents, and Eutonyl and chlorthalidone. In June 1965 he was hospitalized with acute abdominal pain, and the only abnormal abdominal finding was a non-functioning gallbladder by x-ray. While in the hospital he developed acute arthritic symptoms in the left hip. The serum uric acid was 7 mg.%. He was given a course of colchicine therapy and the symptoms subsided. Because of the severe hypertension and congestive heart failure, he was discharged on Aldactazide-A and ColBenemid 1 tablet b.i.d., and has had no further flareup of arthritic symptoms.

Case Number Eight

ER — 73 yr. old WM who had approximately three episodes of severe upper gastrointestinal bleeding in the past 18 months, apparently related to a paraesophageal hiatus hernia. He was found to be hypertensive in June 1964 and was placed on Naturetin 5 mg. daily. Approximately three weeks later he developed acute swelling and redness and pain in the right foot, with some clear drainage from a scar over a rather large bunion of the right great toe. This was assumed to be an acute cellulitis and was treated with an antibiotic without improvement. The toe continued to drain for approximately five weeks at which time a serum uric acid was reported as 12.8 mg.%. The Naturetin was discontinued, and he was placed on cryptenamine — reserpine combination, one tablet b.i.d., and probenecid, one tablet daily. The drainage stopped in approximately two weeks and the lesion healed. He was continued on the antihypertensive medication with Benemid until three weeks later when he developed acute pulmonary edema secondary to congestive heart failure, requiring the diuretic therapy in addition to the previous medications, which did not cause a flareup of acute arthritis. He voluntarily discontinued the probenecid and has been asymptomatic. It is interesting to note that this man developed symptoms within three weeks after the initiation of diuretic therapy.

Case Number Nine

HA — a 69 yr. old WF who had been treated approximately 10 years for hypertension intermittently with various antihypertensive medications, including Naqua, and hydrochlorothiazide with singoserpine. While on the latter medication, she developed severe pain in the left ankle with redness and swelling that subsided spontaneously, but flared up approximately three months later, at which time the uric acid was 7.5 mg.%. This was in July 1964. The diuretic was discontinued and she was treated with phenylbutazone and the arthritic symptoms subsided promptly. The patient was placed on cryptenamine-reserpine combination, one tablet b.i.d., in addition to probenecid one tablet daily, which was continued for approximately one month. The hypertension has been controlled and she has had no further episodes of acute arthritic symptoms except for a mild flareup of arthritis in the right ankle in June 1965, which subsided spontaneously.

Case Number Ten

EN — 39 yr. old WM who had been a known hypertensive for approximately 15 years and had previously been on thiazides, and at the onset of the illness was taking chlorthalidone, 50 mg. daily. He was awakened at 4:00 o'clock a.m. with severe pain in the right knee. The pain became progressively severe and there was a mild to moderate tenderness with minimal swelling of the lateral aspect of the knee. The serum uric acid was 5.7 mg.%. He was given a therapeutic trial on colchicine therapy, and responded within 6 hours. The pain subsided, the antihypertensive medication was switched to singoserpine and he was given a short course of probenecid therapy. He has had no difficulty in the past two years.

Case Number Eleven

DJ — a 65-year-old WF had a past history of arthritis for several years, about 25 years ago. She had been symptom free as far as the arthritis was concerned for many years. She was seen first in November 1964, at which time she was found to have a mild hypertension and was placed on Enduron 5 mg. daily. The blood pressure responded and returned to normal promptly. In April 1965, while on a trip, she had a flareup of her arthritis in her hips and knees, which was quite painful. She was not seen until June 1965, at which time the patient appeared to have some degenerative arthritis of the knees, with minimal inflammation. A serum uric acid was 7.4 mg.%. She left town at the time of the examination and she was advised to continue taking the Enduron, but to add ColBenemid 1 tablet b.i.d. She has not been seen since that time for followup.

Case Number Twelve

EA — 77 yr. WF had been a known hypertensive for about ten years. She had been taking hydrochlorothiazide 25 mg. b.i.d. for approximately six or seven years with fairly good control of her blood pressure. She had had three cerebral-vascular accidents in the interval leaving her somewhat emotionally labile, and with minimal left hemiparesis, but she was able to be ambulatory with a cane. In June 1965 she developed painful heels and found it very difficult to walk. A serum uric acid was taken and found to be 8.8 mg.%. She was placed on phenybutazone for one week and also probenecid, one tablet b.i.d. The symptoms subsided promptly. She was continued on the hydrochlorothiazide 25 mg. b.i.d., in addition to the probenecid, and has remained asymptomatic.

Case Number Thirteen

JSF, a 71-yr.-old WM had a coronary occlusion in November 1961. He also had pernicious anemia for a number of years, and had been taking B-12 therapy. Approximately two months later he developed an acute hemolytic anemia with positive cold agglutinens. He had been a known hypertensive since 1956, and had been receiving hydrochlorothiazide two to four times daily. He developed acute classical gout of the left great toe, two days after Thanksgiving 1962. The serum uric acid was 11 mg.%. The hydro-

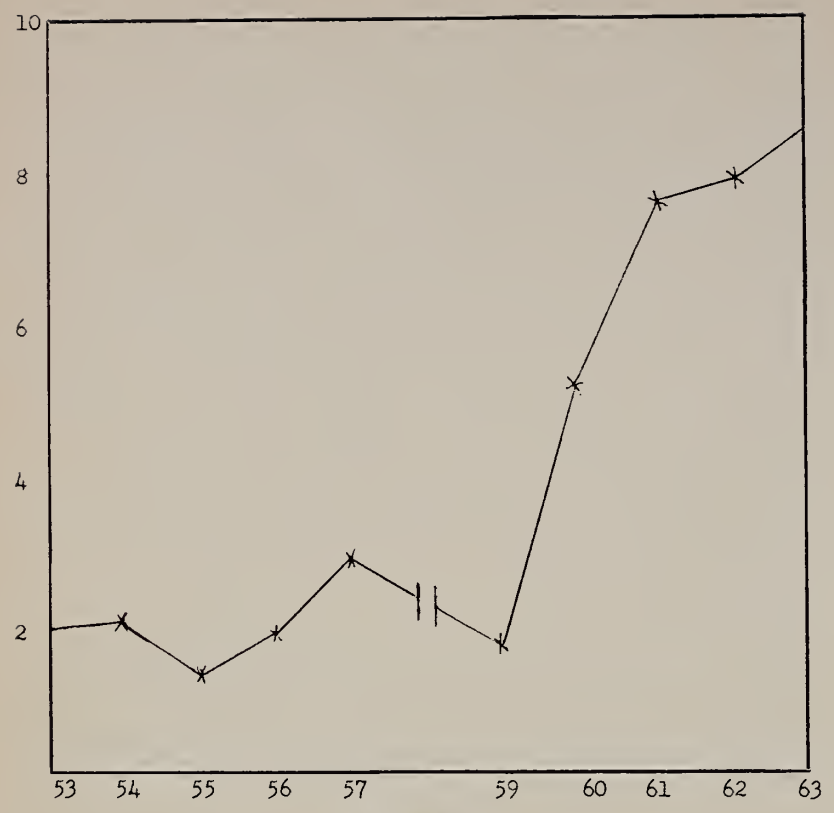


Figure 1

INCIDENCE OF GOUT PER 10,000 HOSPITAL ADMISSIONS SVH & McK 1953-57 and 1959-63 (excluding newborn).

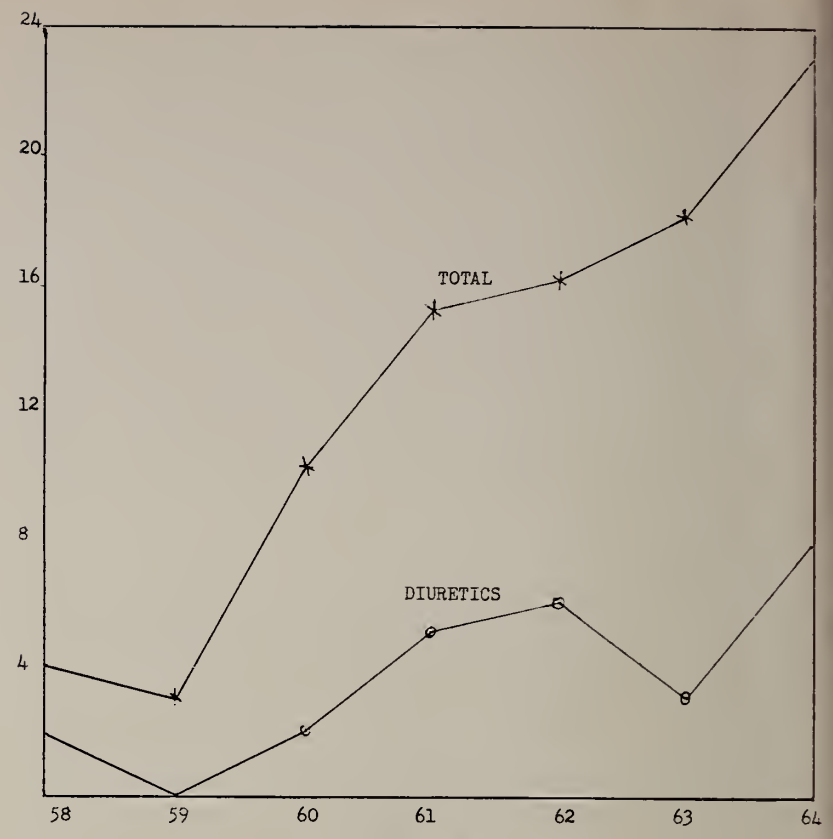


Figure 2

TOTAL NUMBER OF CASES OF GOUT 1958-64 at SVH & McK INCLUDING THOSE RELATED TO DIURETICS.

chlorothiazide was discontinued and he was placed on cryptenamine b.i.d., in addition to ColBenemid, one tablet b.i.d. This medication failed to control his blood pressure and he was placed on a combination of Naqua and reserpine. He has been maintained on this medication for the past two and a half years, without difficulty.

Case Number Fourteen

EG, a 46-yr.-old WF had an interesting history, in that she had inhaled some type of noxious fumes about three years previously, and subsequent to this she developed chronic congestive heart failure, and had to be digitalized and took chlorothiazide 500 mg. daily. She also had a history of duodenal ulcer and occasional chest pain that was suggestive of angina pectoris. There was a strong family history of diabetes. The lady developed acute pain and tenderness about the left medial malleolus. The serum uric acid was 6 mg.%. She was treated with colchicine and responded. The chlorothiazide was continued because of the recurrent edema. She received no uricosuric agent and has not had a recurrence of the gout since initial episode three years ago, despite chronic chlorothiazide therapy.

Case Number Fifteen

AS — 73-yr. old WM was admitted to the hospital complaining of pain, swelling and tenderness of the left hip and both knees, for several weeks. He had been treated with salicylates, and corticosteroids, without improvement, until he developed symptoms suggesting diabetes mellitus, and therefore was admitted to the hospital. This man had been hypertensive for many years, and had been taking hydrochlorothiazide 25 mg. b.i.d. His past history was significant in that he had angina pectoris with exertion and had been taking nitroglycerin. The serum uric acid was 8.9 mg.%, the BUN was 28 mg.%. He was started on a course of colchicine therapy and while receiving therapy developed a paroxysmal atrial tachycardia, and associated acute antero-septal myocardial infarction. He appeared to be making satisfactory progress, but expired suddenly four days after admission to the hospital.

DISCUSSION

From the study of the incidence of gout in two community hospitals, for five years preceding the usage of the thiazide diuretics, and five years during their use, one can make several assumptions. In this study the physician population was relatively constant and the diagnostic awareness of the individuals should not have changed appreciably. There is a relative, as well as an absolute, increased incidence of diagnosis. There is a marked increase in the number of the individuals receiving thiazide diuretics, or related compounds, hospitalized with the diagnosis of gout. If the patients with cardiac decompensation, hypertension, or cirrhosis, could have been studied more carefully regarding their drug ingestion, perhaps the incidence would be higher.

If we can assume that a high percentage of patients receiving oral diuretics have elevated uric acid levels, 80% in small series on chronic therapy; we can expect an increased incidence in these patients should they undergo trauma, surgery, febrile episodes, or receive certain other drugs that may precipitate acute gout. Many cases of gout may be undiagnosed if the clinical course is not classical, as any peripheral joint may be involved. The course may be subacute, fever and redness may be absent; also, we are dealing with an age group that may have other forms of arthritis that respond to nonspecific anti-arthritic agents. These patients respond to specific anti-gout therapy such as a full course of colchicine, confirming the diagnosis.

The preceding case reports demonstrate classic as well as atypical forms of gout, many associated with a definite precipitating incident while on oral diuretics. With the widespread use of the oral diuretics, we must learn to recognize gout as a major complication of this type of therapy, possibly approaching the incidence and severity of hypokalemia.

When the diagnosis is made, appropriate therapy should be instituted promptly. These patients respond to colchicine in full therapeutic dose, phenylbutazone, indomethacin or corticosteroids if indicated, apparently they should also respond to allopurinol. If possible, these patients should be switched to other types of diuretics such as aldosterone antagonists, or to other types of anti-hypertensive agents. If these approaches are not feasible, most of these patients can be maintained on the drug with the addition of Benemid, ColBenemid, or sulfinpyrazone.

SUMMARY

A series of fifteen private patients receiving oral diuretic therapy who developed gout is briefly discussed. The increased incidence of clinical gout in two community hospitals, since the introduction of thiazide diuretics, is shown. The mechanism of action is apparently due to decreased secretion by the renal tubule, with a resultant elevated serum uric acid, followed by clinical gout. Management is similar to that of primary gout, and the offending agent should be omitted if practical.

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Talbot, J. H. **"Gout"** 2nd Edition Grune & Stratton New York 1964.
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DRUGS

Generic Name	Trade Name
quinethazone	Hydromox
bendroflumethiazide	Naturetin
trichlormethiazide	Naqua
methyclothiazide	Enduron
chlorothiazide	Diuril
hydrochlorothiazide	Hydrodiuril, Esidrix, Oretic
chlorthalidone	Hygroton
polythiazide	Renese
sulfinpyrazone	Anturane
indomethacin	Indocin
probenecid	Benemid
cryptenamine	Unitensen
pargyline hydrochloride	Eutonyl
zoxolamine	Flexin
tolbutamide	Orinase

AREA FORTUNATE TO HAVE MEDICAL STAFF

We read with interest last week an editorial that appeared in a southeastern South Dakota weekly newspaper expressing concern over a shortage of medical doctors in the community.

The editor did not go into detail as to how many doctors the community had, but he explained the situation was not unusual, and that there were some communities of adequate size in the area that didn't even have general practitioners.

We have heard reports from other communities in the state who also are having a hard time keeping their present medical staff or who are looking for a doctor.

A small community in the south central part of the state completed construction of a fine new hospital last summer and only last week found a doctor to practice there. Another community has a hospital, but has been unable to obtain a doctor.

In noting a need for expanded medical facilities in his community, the editor gave several reasons for the shortage of doctors.

One cause was the limited number of medical schools and number of doctors being graduated each year. This problem makes it impossible to provide enough doctors to keep up with the population explosion.

"A second reason why it is difficult to get a general practitioner (and specialists, too) into a community such as this, is that they are overworked. Overworking comes not only from an increased population, but also from greater demand for medical services," the editor said.

The editorial also brought out the fact that years ago most people went to doctors only when absolutely necessary to cure a physical ill, but now it seems some people go to a doctor for almost any reason.

Doctors today must use a great deal of skill in dealing with people's emotions or thoughts. When someone thinks he is sick, the best course is to see a doctor. And truthfully speaking, a great number of people who see doctors are probably not physically sick . . . yet they must be cared for and often treated as though they were.

The editor surmised that doctors like to live normal lives like the rest of the people and it seems logical that they should be given the chance to do so. He suggested that a community should make an effort to provide better working conditions as well as normal (or as normal as possible) hours of work for the doctors with the idea that a tired doctor cannot be expected to do his best job.

There should be no doubt that the medical facilities in Webster compare favorably with almost any community its size in the state, and Webster residents and neighboring communities should consider themselves fortunate to have these facilities and doctors available. There are presently five doctors to staff the new clinic and the hospital, and although there is probably enough traffic to warrant more doctors, they are hard to come by.

After viewing some of the problems other communities are having in keeping and obtaining doctors, we suggest you treat the medical staff available to you with loving care.

Reprinted from the **Webster Reporter,** February 10, 1966.

Owed To the Detail Man

Detail men can be a pleasure or a nuisance. It depends on the circumstances . . . A quicky description of the product, a great deal of personal charm, and in and out in five minutes or less would make more detail men welcome. And let's take them one at a time. Neither the physician nor the detail man wants his district manager along to listen in. — Editorial in **Massachusetts Physician,** (25:130), February 1966.

A MORE VIGOROUS THERAPEUTIC APPROACH TO CHRONIC OBSTRUCTIVE AIRWAY DISEASE

By

David E. Dines, M.D.
Rochester, Minnesota

Chronic obstructive airway disease, which includes both emphysema and chronic bronchitis, has received considerable attention in the medical and lay press; yet, each day we encounter patients with obstructive airway disease who are not following a specific program of treatment and who, in many cases, continue to smoke. A more vigorous therapeutic approach is necessary and should entail placing each patient on long-term therapy to improve ventilation, to provide more efficient breathing, and to increase exercise tolerance.

Illustrative Cases

Case 1. — A 53-year-old man first was seen at the Mayo Clinic in June 1964 with severe obstructive airway disease with emphysema, cor pulmonale, and congestive heart failure. He had grade 4 dyspnea (graded on the basis of 1 to 4) and was completely incapacitated. Results of pulmonary function tests confirmed the severity of his obstructive airway disease (Table 1). His arterial blood was desaturated at rest and markedly desaturated after 3½ minutes of exercise.

He was placed on a low-sodium diet, digitalized, and given diuretics orally. He was advised to follow a therapeutic program consisting of breathing exercises, nebulization therapy (with motor compressor and hand bulb), expectorants, bronchodilators, and periodic use of antibiotics for infections of the upper part of the respiratory tract. He also was instructed to stop smoking.

When he returned in May 1965, he was working full time. He had not required phlebotomy since dismissal in June 1964.

Case 2. — When this 54-year-old man first was seen in December 1964 he had chronic cough, sputum production, and shortness of breath. Pulmonary function studies (Table 2) confirmed that he had moderately severe obstructive airway disease with emphysema. He was advised to follow a vigorous program and to stop smoking. When he returned in May 1965, he was working full time and exercising daily with relatively little disability. His mental outlook had improved markedly.

DISCUSSION

Results of Treatment. — Pulmonary function rarely improves after a patient with advanced obstructive airway disease has been on a program of treatment. Bates and co-workers[4] found low diffusing capacities indicative of a

Table 1
Results of Pulmonary Function Tests in Case 1

Test	Estimated normal	6/12/64	5/24/65	After isoproterenol
Pulmonary volumes				
Vital cap. (expiratory) (liters)	4.0	2.68	2.86	3.65
Inspiratory vital cap. (liters)	4.0	. . .	2.93	
Residual volume (liters)	1.4	4.21	4.65	
Total cap. (liters)	5.4	6.89	7.58	
RV/TC x 100 (%)	40	61	61	
Functional residual cap. (liters)	2.4	4.86	5.22	
Expiratory reserve (liters)	1.0	0.65	0.56	
Max. breathing cap. (liters/min)	101	51	56	74
Max. midexpiratory flow (liters/sec)	2.0	0.6	0.6	0.6
Expiratory slowing (grade 1 to 4)	0	3	3	3
Nitrogen washout index (%)	2.5 or less	8.0	2.9	
Arterial oxygen sat., oximeter (%)				
Resting (air)	95-98	92	85	
Resting (oxygen)	100	100	100	
Before exercise (air)	95-98	93	85	
Exercise (air), 3.5 min*	No fall	85	75	
Exercise (oxygen), 3.1 min†	100	100		
Ventilation (at sitting rest, breathing oxygen)				
Liters per minute		11.12	14.14	
Rate: respirations per minute		21.0	21.0	
Average tidal volume (ml)		530	673	

*Some shortness of breath; legs tired.
†Legs tired.

Table 2
Results of Pulmonary Function Tests in Case 2

Test	Estimated normal	12/8/64	5/27/65	After isoproterenol
Pulmonary volumes				
Vital cap. (expiratory) (liters)	4.3	3.29	4.10	4.64
Inspiratory vital cap. (liters)	4.3	. . .	4.25	
Residual volume (liters)	1.5	4.08	2.72	
Total cap. (liters)	5.8	7.37	6.97	
RV/TC x 100 (%)	40	55	39	
Functional residual cap. (liters)	2.6	4.85	3.71	
Expiratory reserve (liters)	1.1	0.77	0.99	
Max. breathing cap. (liters/min)	108	47	65	74
Max. midexpiratory flow (liters/sec)	2.0	0.7	0.9	1.3
Expiratory slowing (grade 1 to 4)	0	3	3	2
Nitrogen washout index (%)	2.5 or less	2.0	1.6	
Arterial oxygen sat., oximeter (%)				
Resting (air)	95-98	97	99	
Resting (oxygen)	100	100	100	
Before exercise (air)	95-98	99	99	
Exercise (air), 3.5 min	No fall	96	99	
Exercise (oxygen), 3.1 min	100			
Ventilation (at sitting rest, breathing oxygen)				
Liters per minute		7.54	7.28	
Rate: respirations per minute		13.0	9.6	
Average tidal volume (ml)		580	758	

poor prognosis, but we have not been checking diffusing capacities routinely in obstructive airway disease. Boushy and Coates[5] reported on four parameters of pulmonary function (maximal voluntary ventilation, forced vital capacity, carbon dioxide tension, and oxygen saturation), which they found to be related to prognosis. Blood gas abnormalities tend to reflect the severity of the illness, primarily in acute exacerbations with infection, and not clinical impairment or prognosis.[6]

Since his first visit here the first patient had been working full time despite his marked arterial oxygen desaturation. There was no change in the residual volume:total capacity ratio, maximal breathing capacity, and maximal midexpiratory flow. The nitrogen washout index[8] improved from 8.0 to 2.9% which suggests the gas distribution was improved. Uneven gas distribution is a consequence of parenchymal lung distortion and destruction in diffuse emphysema. Even though the distribution of inhaled air shows marked unevenness,[11] there remains enough ventilation of the lung tissue that still is perfused to allow discharge of CO_2, and arterial hypoxia is of moderate degree. Hyperventilation persists, as it did in this patient. The Astrup value revealed that the pCO_2 was much lower, and the electrocardiogram showed improvement in that there no longer was the pattern of right atrial and right ventricular enlargement.

After treatment, the second patient showed an increase in vital capacity, decrease in residual volume and residual volume:total capacity ratio, and decrease in functional residual capacity. The functional residual capacity represents hyperinflation which may result from structural lung changes or partial obstruction to the airway. On the basis of autopsy studies, Sweet and co-workers[14] found that the residual volume:total capacity ratio correlated better with the morphologic findings in emphysema than did the maximal breathing capacity or nitrogen clearance. Burrows and co-workers[7] found a relatively close correlation between the residual volume:total capacity ratio and the severity of expiratory slowing.

Methods of Treatment. — No treatment of obstructive airway disease can be successful without the complete cooperation of the patient. Smoking in any form must be discouraged. Smoking has been shown to be associated with parenchymal lung damage.[1, 3] Chronic cough and expectoration have been found to be related to cigarette smoking.[12]

Bronchodilators relax and dilate constricted or collapsed airways. They improve the bronchial airway and allow secretions and plugs to be coughed up more easily. Ventilation is improved as all parts of the lung become available for gaseous exchange. Isoproterenol (Isuprel) can be administered in a DeVilbiss 40 nebulizer or by a nebulizer with an air compressor. Intermittent positive pressure breathing with isoproterenol nebulization is beneficial, in hospitalized patients or in outpatient inhalation-therapy clinics, to improve ventilation in all

parts of the lung. The administration of a bronchodilator by nebulizer should be followed 1 hour later by administration of an oral preparation to promote a more lasting bronchodilating action. The small pocket-nebulizers containing bronchodilators give relief for only 15 to 20 minutes, and rapid recurrence of symptoms often leads to overuse.

Secretions should be thinned by oral administration of a saturated solution of potassium iodide or glycerol guaiacolate. Patients with thick, purulent secretions will benefit from aerosol therapy administered with an aerosol mask for 20 to 30 minutes four times a day. Heated aerosol adds a large volume of droplets to the inhaled atmosphere and may be more efficient. Acetylcysteine (Mucomyst),[15] administered by intermittent aerosol or by instilling 1 to 2 ml of a 5 to 10% solution into the trachea every hour, may be effective in liquefying mucous and tenacious secretions in some patients. It is not necessary in the average case.

Control of infection with intermittent administration of a tetracycline helps to prevent progression of the disease. Evidence has been presented recently to suggest that the most common variety of emphysema (centrilobular) is the result of repeated low-grade infections of the small airways by **Haemophilus influenzae.**[9] **H. influenzae** and **Diplococcus pneumoniae** have been shown to be the two principal organisms associated with recurring infections in chronic bronchitis.[13]

Breathing exercises are helpful in the physical conditioning. More efficient breathing can reduce hypoxia and relieve respiratory acidosis. The improvement in the arterial oxygen saturation relieves the pressure in the pulmonary circuit and eases the work of the right ventricle. With a better respiratory and cardiac status, the patient can increase his exercise tolerance, and an increased exercise tolerance improves the morale. Training with graded exercise and employing a portable oxygen supply and a walker can be utilized to condition patients with emphysema who have become physically unfit from excessive immobility.[2, 10]

Patient education is an important aspect of treatment and provides an understanding as to the long-term nature of the program. Ancillary factors in a successful long-term program include: avoidance of overcoughing, high fluid intake for liquefaction of secretions, precautions against dust, avoidance of known allergens, and wearing a cold-weather mask in winter months.

Summary

Two patients have been presented who had chronic obstructive airway disease (one had cor pulmonale, congestive failure, and polycythemia) and who have been rehabilitated to productive employment. The parameters of pulmonary function have been discussed in terms of determining prognosis. Pulmonary function rarely improves in patients with advanced disease but this does not preclude that patients will not benefit subjectively and be rehabilitated. Treatment has been discussed. The approach should be a vigorous one to improve ventilation, provide more efficient breathing, and increase the exercise tolerance.

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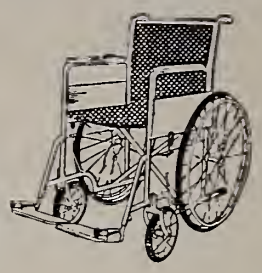
Side Effects — True or False?

The (FDA) adverse reaction program is off to a fair start and should get better, but concentration on side effects has put too much information into the hands of the laity and the uninformed, who tend to misinterpret. As a consequence, more side effects are being reported now that aren't really side effects, but rather the imaginations of those who got their hands on medical advertising or package inserts. It is the duty of the manufacturers to provide all the information to the physician about the drugs they make. All side effects should be clearly spelled out for him, but they should not be emphasized over and above the therapeutic activity. — Robert W. Ballard, M.D., in **Food Drug Cosmetic Law Journal.** (21:31), January 1966.

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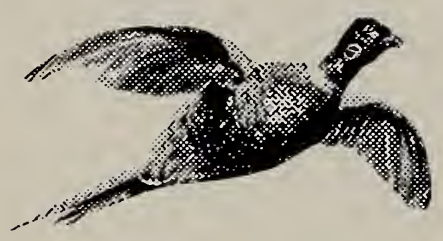
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ABORTION IN MODERN TIMES: THOUGHTS AND COMMENTS

By H. B. Munson, M.D.
Rapid City, South Dakota

Foreword:

The present South Dakota law concerning the procurement of an abortion is contained in the South Dakota Code, Section 1, 13.3101 and was passed in 1939. In essence, it states that "every person who" tries (by any of several methods listed) to cause the abortion of a pregnancy, "unless the same is necessary to preserve (the mother's) life," is punishable by imprisonment in the State Penitentiary not more than three years, or in a county jail not more than one year.

Section 2, 13.3102 states further that the woman herself shall be liable to a fine of one thousand dollars, or to a year in a county jail, or both.

* * * *

The purpose of this paper is to present some ideas and arguments toward making a bold revision of the law, to broaden out its provisions and extend its benefits to many people besides those women in danger of dying from pregnancy.

During February and March, 1965, a church group did the citizens of South Dakota the favor of taking a survey of the doctors' opinions about the indications for therapeutic abortion. Something should probably be said now by way of assessing the role of abortion in human affairs, and making a plea for some broadening changes in the present outmoded law.

Induced abortion, as a solution to the age-old predicament of unwanted pregnancy, has been roasted and condemned through the ages as a form of murder, but in recent years we have sometimes heard it described in somewhat more favorable terms. Examples of these are, "mercy," "humane procedure," and, more recently, as a "human right" of the person impregnated.

These more favorable concepts are at a disadvantage at present. They are mostly new to the public. But the fact is that the problem of unwanted pregnancy varies all the way from an inconvenience to a catastrophe, and the person who finds herself trapped and imprisoned with this condition may use many complimentary descriptive terms in describing the procedure that would erase the pregnancy and set her free.

The difficulty of trying to support these favorable concepts of abortion is heightened by the fact that these emancipated women who have been granted an abortion are hardly ever heard from again. This seems regrettable, when these women's expressed opinions might really count for something. It is certainly a strong possibility that if these women would organize and work, they could force the state legislatures to write some bold revisions into the abortion laws.

A minister once said he found it thrilling to look into the face of a child. "But it is also about the most disturbing experience I know of," he said, and went on to describe the feelings of inadequacy and heavy responsibility that came over him when he contemplated the face of any child — "all that potential for good or evil, and I am partly responsible for how it is managed."

Since it is reasonable and right for each of us to be concerned about what happens to every child, so it also seems reasonable to ask whether any woman or girl should not have the right to decline to bring another child into this world, even **after** having conceived it. At any rate, it seems appropriate to suggest that the world should be so organized that each child born should be a "sent for" child, in this time of a world full of people. In other words, the world probably should be so organized that a woman should deliver only those children that she has actually sent for and is willing to assume responsibility for, even though the implementing of this principle would surely be difficult at times.

Some people protest that human life is too precious for us to consider any deliberate inducing of abortion, but let us consider a modern truth: that human life is aggressive and expansive. Mankind has been so successful in postponing death, that now the urgent problem on our planet is how to deal with the abundance of human life. Therefore should we not reconsider whether it isn't human life with dignity that is the precious thing, — not just human life as such.

As for the accusation, "murder," it should be pointed out that almost no society on earth regards abortion as murder. Certainly the United States, with its estimated "one million induced abortions yearly"* does not regard it so. After all, one can hardly equate, on the one hand, the taking of life from a breathing, thinking, full-fledged human being, with, on the other hand, the denial of life to a bit of vegetating unborn matter, that, so far as we can tell, is unable to suffer and apparently doesn't even have any awareness of its own existence.

Some people have volunteered to defend the embryo's right to live. This is all right, but should we not also have some argument in favor of the individual's **right to die.** (Let us allow that it might wish to have a voice in the discussion.) It appears that there are people who would gladly have volunteered to be cancelled out, during those meaningless intra-uterine days, if by so doing they could have spared their mother a lot of suffering, — say, from shame, or poverty, or poor health, or anything else troublesome. Quite probably they would wish they had never been born, if that pregnancy caused embarrassment or trouble to their mother. And should we not allow fetuses their right to die if there is a strong likelihood of their being handicapped physically or mentally? Perhaps we are not big enough or wise enough to make that decision, but there seems to be solid grounds for allowing the unborn's parents to decide this, since it is they who will be the most encumbered and troubled in caring for the child.

Another aspect to the question is that of the irresponsible young women and **their** pregnancy problem. Apparently there is a desire among many people to see these young ladies go through with their pregnancies, since they brought it all onto themselves. It seems that the idea is to "teach them a lesson," and maybe to let their plight serve as a deterrent to others.

Maybe such a girl will learn something from that kind of stern "justice." But these days it seems a questionable practice even to allow an irresponsible mother to take responsibility for the rearing of a child, much less force her to do so. If she behaves irresponsibly that isn't good, but we should never allow a child to suffer for it. The fact that these days we not only allow her to keep her baby, but that to a large degree we force this state of affairs by denying her an abortion would seem to make us guilty of mismanagement. Is it not regrettable that the law, in effect, commands such women to go through with their pregnancies, on to the delivery room and to spurious "motherhood"?

Of course, we must concede that the law does not actually rule against any mother's placing her baby for adoption, but it does refuse her an abortion, and by the time most women have reached term pregnancy they are, in a sense, driven by their instincts to "do what comes naturally," and retain the baby they have delivered. Even the unattached woman often refuses to be influenced by facts or persuasion, although she knows that her own future as a free adult female will be greatly impaired by her keeping the child, and though she realizes that she probably cannot ever give the baby a normal home.

A normal home, it would seem, is one where there are both a mother and a father, where there is enough income to provide the basic necessities of life, and enough extra to buy a few additional desirable items occasionally. (There should be some flexibility in this definition, if there are special circumstances to be considered.)

A married woman once said, "No, sir, even if it's going to be a burden, I won't **allow** adoption of this baby: When it's born I'm going to **keep** it. I might not **love** it, but I'll **keep** it!" An unmarried girl, aged sixteen, said, "Oh, I couldn't give up my little girl! My aunt and uncle and all of my sisters and brothers just **love** her!"

From this it may be presumed that many of the babies of unwanted pregnancy are not likely to be reared in a "normal" home.

OPPOSITION

One hears the argument offered that a more liberal law would not be very good for society ("too hard to control") or for the practice of medicine ("too many obnoxious pressures being exerted upon the doctors"), but these objections seem not well founded.

As for the difficulty of controlling a more liberal law, this problem is probably no more formidable than trying, as the law does quite successfully, to control the speed of vehicles on the streets and highways. The control is not perfect, but certainly it is not a situation where everyone driving may do whatever he wishes, at his own whim. Another example is the at-

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* Calderone, Mary: **Medical Tribune,** November 1, 1963.

tempt by law to control people's drinking habits. Not a perfect control, but probably a better deal than to return to prohibition.* The predicted inability to control perfectly the abortion "traffic" should be quite an acceptable risk, considering that at present the so-called "control" only produces a bootlegging business, with frightful risks to women's health and an undue amount of risk to life itself.

Regarding the troublesome pressures to be put upon physicians, there are many individuals who feel that the doctors should probably be a lot more willing and ready to help the non-medical community with this problem. The physicians should certainly accept their own share of the burden, in order to effect some improvements in this aspect of life.

PALLIATION AND PROGRESS

There are some people who believe in palliating the situation, by such means as Florence Crittenton Homes, Child Welfare Programs, Adoption measures, and others. The trouble with these programs, however, is that they don't go far enough.

The American Law Institute, 1959, recommended that abortion be permissible if "there is substantial risk that continuance of the pregnancy would gravely impair the physical or mental health of the mother or that the child be born with grave physical or mental defect, or that the pregnancy resulted from rape or from incest." The Unitarian Universalist Association in 1963 passed a resolution stating that the present abortion laws are "an affront to human life and dignity," and recommended that they be broadly liberalized.

Certainly,

(a) "when a thirteen year old girl bears a child fathered by her own father, and then herself must be placed in a foster home,

(b) when a twenty-eight year old school teacher, six months following the delivery of a baby conceived by rape, commits suicide because she feels unworthy and unclean,

(c) when an unwed mother of five children is released from a mental hospital to scream at her newly born sixth child, 'I hate you!' "†

palliative remedies are shown to be inadequate.

Then there was Isabell Kainoa of San Francisco, whose despair drove her to jump from the Bay Bridge in December, 1964.** She had a complex of problems, it is true, but they had seemed controllable until she became pregnant for the fifth time. This incident should not be dismissed with the argument that she should have used contraception, or that, after all, women are likely to threaten suicide just to get a doctor's sympathy and cooperation.

There was also a young Rapid City lady of 20 years, (name not printed in the news story), who in October, 1964, slashed her own wrists in an attempted suicide after having been attacked and raped. This incident underscores the mental anguish on the part of some of the victims of rape.

SAFEGUARDS

The present law is summarized in the Foreword. People have inquired as to what safeguards might be attached to a more liberal law, to prevent its being abused. In the opinion of some doctors, the stipulation in Richard Bielski's bill* is probably adequate; namely, that decisions on the individual cases be subject to the concurring opinions of three licensed physicians.

Such a small number of evaluators undoubtedly leaves more chance for "undeserving" cases to get through. Nevertheless, the required number of opinions should probably be no greater than three because wherever committees of several people sit in judgment, decisions are likely to be too late to be very useful. When we realize that a few weeks' delay while waiting for a committee "to meet and decide" can mean that a low-risk patient will become a high-risk patient, it may be appreciated that committee decisions must be quite promptly available, in order to be of much value. As a famous jurist once said, "Justice too long delayed is justice denied."

The model abortion law proposed by the American Law Institute may appear to be a big improvement, but even that law should probably include more categories, and the terms "grave" and "gravely" seem far too stringent. There is an apparent value in the provision of the above-mentioned bill that would have extended the permissibility of abortion to those pregnancies believed not "to be in the best in-

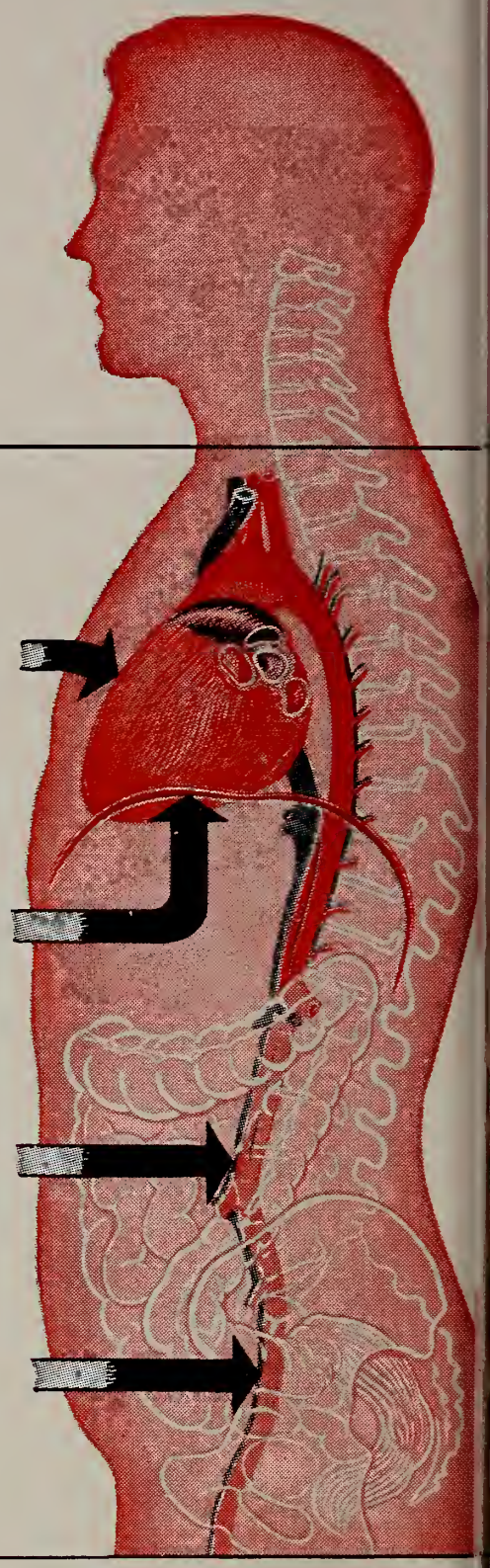
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* Lecture by Dr. G. Hardin, Univ. of Calif. Abortion and Human Dignity 1964.
†A.H.A. News, March 1965
**A.P. News story

* House Bill No. 661, thirty-eighth session Legislative Assembly, State of South Dakota.

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(Continued from Page 25)

terests of society,"**provided** the patient's signed request is required, — and that three physicians have to concur in the opinion.

LAWS AND THEIR EFFECTS

When we force the family that is already under great strain to "move over and make room for another child," are we not doing a disservice to the community? In far too many cases we are adding to the welfare rolls, to the problems of mental health, to the number of broken marriages, and other social troubles. When we say "No" to the widow or divorcee, who has conceived as the result of an indiscretion, it would seem we are working a hardship especially on her present children, whose social attitudes may get badly impaired when they learn that their mother is pregnant. Also, if mother is well-known among the younger set, the continuance of her pregnancy may have an unwholesome effect upon many people. Of course, this event will be unlikely because mother will try to procure an illegal abortion. This is almost a foregone conclusion, at whatever the risk and whatever the price.

There are some people who protest that a more permissive law on abortions would allow the irresponsible individuals too easy an escape, and they fear that it could foster a blithe immorality. Here one should point out that it would be an embarrassment and a great inconvenience to have an abortion, even under the best of circumstances. Quite expensive, too. It would be likely to have a chastening effect upon anyone who experienced it.

Would a more permissive law be likely to lead to the murdering of adults? This seems so unlikely as to deserve no comment.

MORALITY AND A MORE LIBERAL LAW

Perhaps we should take one more look at the matter of the morality involved. A group of several Protestant ministers picked at random in late 1964 indicated in their responses to a questionnaire a strong sentiment (about 81%) favoring the allowance of abortion for mental or physical unfitness, for rape or incest, for abnormalities of the fetus, and for feebleminded mothers whose relatives request it. (They were not polled as to their attitudes on other socio-economic indications).

CONCLUSIONS

Somehow, in times past, we were sold a law which has discriminated unfairly against girls and women and children for all these years. Now we are being made to recognize that when

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we stand and allow certain pregnancies to go on we work an injustice.

That injustice may be to the mother, unfit or unsuitable by reason of mental or physical handicap. That injustice may also very well be to the unborn children, or to the family already born, or it may also be to society as a whole. We really ought to be doing better than this, especially in these days when our knowledge is increasing about the causes of the battered child syndrome, and as more and more concern is being voiced over broken homes, juvenile delinquency, mental pathology, perpetual poverty, and other problems of human beings.

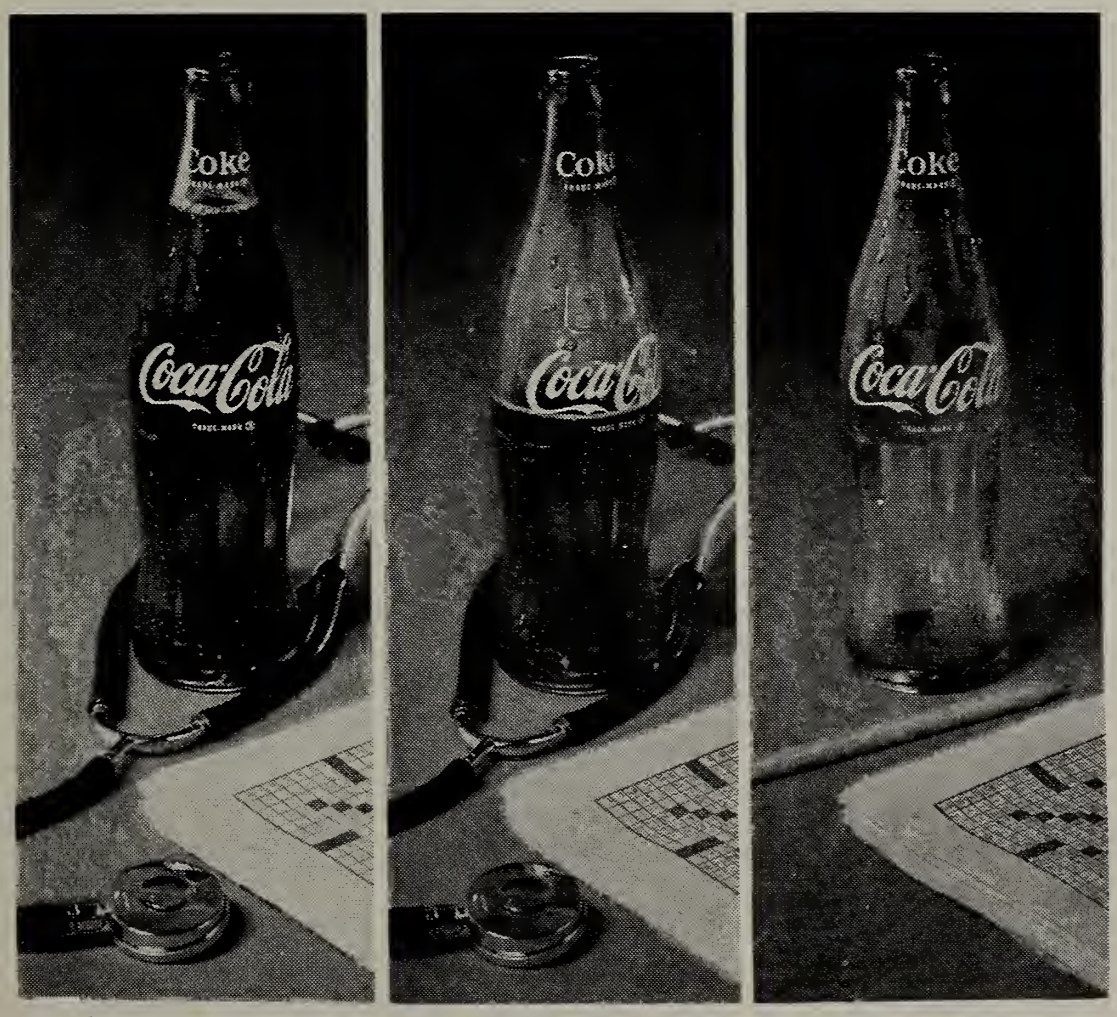
Physicians and colleagues, our generation is having to re-examine the whole subject of birth control in the light of new knowledge. Surely now is a proper time to throw the light of present day knowledge and present day mores into this neglected corner to which the subject of abortion has been relegated. New occasions teach new duties, and the time has come to make changes.

The South Dakota Society of Obstetrics and Gynecology, at its meeting in May, 1965, passed three resolutions on the subject of birth control. These resolutions took note of the fact that the American Medical Association's House of Delegates, at a clinical meeting in late 1964, had issued a public statement that the medical profession should accept major responsibility and take the leadership in matters relating to human reproduction affecting the total population and the individual family.

Noting also that the situation of the Obstetrician-Gynecologists is such as to make them feel especially responsible in this regard, the South Dakota OB-Gyn Society called upon the South Dakota State Medical Association to make a formal request that our state legislature enact the following legislation:

I. A law providing that contraceptive medicines, devices, and information be provided free to married couples who cannot afford to buy them, (and to certain other appropriate individuals).

II. A law stating that the sexual sterilization of either males or females as a contraceptive measure is a lawful procedure, such statute to be essentially like the law al-



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ready in effect in North Carolina and Virginia.*

III. A law modifying the present statute concerning the procurement of abortion, stating that if the patient and her husband, if there be one, request the procedure in writing, and if three physicians agree, induction of abortion shall be lawful:

A. whenever it is necessary to preserve the mother's life or well-being.

B. whenever the pregnancy is the result of rape or incest.

C. whenever medical evidence indicates that the child has a strong chance of being mentally or physically handicapped.

(Where an unwed mother is under age, it is suggested that her parents' or guardians' signature should also be required.)

It is hoped that all physicians in the country who can do so in good conscience will help to promote and achieve these legislative changes. Our federal government and many state governments are pondering these issues, and quite possibly will be trying to take action. As physician citizens we should be doing our best to help such changes occur.

* On October 12, 1965, the Black Hills District Medical Society voted in favor of a model sterilization law for South Dakota, (a modification of the Carolina and Virginia laws) and called upon the State Medical Association to promote its passage in the legislature.

How to Eliminate Confusion

Were each drug prescribed a simple, chemically pure substance, one would not be so concerned. However, even the potency of natural products may vary from batch to batch, particularly in the case of the most active ingredients. Consider the great variety of preparations of digitalis, strophanthus, belladonna and other similar substances. Consider also the variety of substances derived from the thyroid gland and other glandular products. In such instances, the simple statement of a generic name does not begin to convey to the user or the prescriber a real picture of the quality of the product. Pharmaceutical manufacturers have offered to the American consumer a variety of preparations from which to choose; the manufacturer, by giving his product a name exclusively his own, identifies that product to the prescriber and the user, and eliminates the possibility of confusion. — Morris Fishbein, M.D., in **Postgraduate Medicine,** (39:205), February 1966.

The Federal Government Decides . . .

As of today, the Federal government may designate the official name of a drug product, if it is not satisfied with the originator's suggestion. The Federal government maintains surveillance over clinical research on the project, and can halt or redirect it at any time. The Federal government decides whether the product can be placed on the market. The Federal government decides when to permit its sale. The Federal government decides its method of distribution. And finally, the Federal government decides what can be advertised about the product. It is still within the privacy of our industry to make two important decisions — whether to undertake laboratory research on a given project, and what to charge for a product. — C. Joseph Stetler to Northern California Pharmaceutical Association, January 29, 1966.

The Drug Without Side Effects

There exists an unrealistic public image of drugs that there could be remedial agents with various and optimum therapeutic effects without any toxicity. This is clearly utopian. The drug without side effects still remains to be discovered and it is most unlikely that it will ever be found. — Cornielle J. F. Heymans, M.D., in **Georgetown Medical Bulletin,** (18:174-175), February 1965.

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Path CAPsule

Submitted by the College of American Pathology in connection with the South Dakota Society of Pathologists.

SERUM PROTEIN BOUND IODINE AS A MEASURE OF THYROID FUNCTION

It is now well recognized that the measurement of serum protein bound iodine reflects the concentration of circulating thyroid hormone. Therefore, the determination of the protein bound iodine furnishes a reliable index of thyroid function.

IODINE METABOLISM

The two main sources of iodine are food and water. Iodine is absorbed from the gastro-intestinal tract as iodide and the iodide is selectively trapped by the thyroid gland from circulating blood. In the thyroid gland the iodide is utilized in the synthesis of thyroid hormones.

The first step is the oxidation of iodide to free iodine. The free iodine then combines with tyrosine forming iodotyrosines; included among which are triiodothyronine (T_3) and tetraiodothyronine or thyroxine (T_4).

These and other iodo-amino acids are found in the thyroid in peptide linkage as part of the thyroglobulin molecule. The T_3 and T_4 are liberated from thyroglobulin by proteolysis and gain access to the systemic circulation. They are reversibly bound to the plasma proteins and represent the protein bound iodine. Thyroxine (T_4) represents a much larger fraction of the protein bound iodine (80-95%) than does the T_3.

CLINICAL INTERPRETATION

The normal level of protein bound iodine is 4.0-8.0 mcg.%. The concentration of PBI is relatively constant in normal individuals. The overwhelming majority of hypothyroid patients will have a diminished PBI, however, one may occasionally find a hypothyroid patient with a PBI in the normal range. Similarly in hyperthyroidism most patients will have an elevated PBI but many authors report some patients with a normal PBI. For this reason it is well to utilize more than one diagnostic procedure in evaluation of patients with suspected thyroid disease.

For many years it has been recognized that abnormal concentration of protein bound iodine may be encountered in many conditions in which there are no clinical findings suggestive of thyroid disease. Many of these may be related to alterations of thyroxine-binding proteins. Moreover, many drugs may cause elevation or depression of the PBI depending upon either a pharmacologic or non-pharmacologic basis. Furthermore, many iodine containing compounds which are administered to a patient for diagnostic or therapeutic purposes will cause false elevation in the PBI because of interference in the clinical procedure.

The following chart will aid in the evaluation and interpretation of PBI results.

FACTORS INFLUENCING PBI RESULTS

DECREASED VALUES

Hypothyroidism
Nephrosis
Chronic debilitating illness
Cytomel therapy — due to inhibition of TSH production
ACTH & Cortisone therapy
Antithyroid drugs — Propylthiouracil, Tapazole, etc.
Methyl testosterone therapy — due to decrease in thyroxine binding globulin
Other Drugs:
- Mercurial diuretics
- Dinitrophenol
- Salicylate in high dosage
- Tetrachlorthyronine
- Chlorpromazine
- Reserpine
- Dilantin

INCREASED VALUES

Hyperthyroidism
Pregnancy
Hepatitis — early in course of disease. Normal values obtained after first month of illness.
Post thyroidectomy—immediately after surgery.
Thyroxine administration
Thyroid extract
TSH administration
Estrogens
Enovid and similar drugs
Massive doses of inorganic iodides and bromides
Trilafon
Lugol's solution
Organic iodine compounds
- Iodothiouracil
- Dithiazonine iodide
- Floraquin
- Vioform
- Cough syrups

Vitamins containing iodine

BSP — due to presence of organic iodine contamination in some lots
Barium sulphate for GI X-Ray — due to its iodine content
X-Ray contrast media

DURATION OF INTERFERENCE BY VARIOUS DRUGS

Cholografin	4 Months
Diodrast	2 Weeks
Hypaque	1 Week
Lipiodol	Greater than 5 years
Pantopaque	6 Months
Telepaque	5 Months
Dionosil	Up to 5 Months
Urokon	1 Month
Teridax	Many years
Priodax	3-4 Months
Orabilex	1-2 Months
Biligrafin	1 Month

REFERENCE

Evaluation of Thyroid and Parathyroid Function, Sunderman and Sunderman, J. Lippincott, 1963.

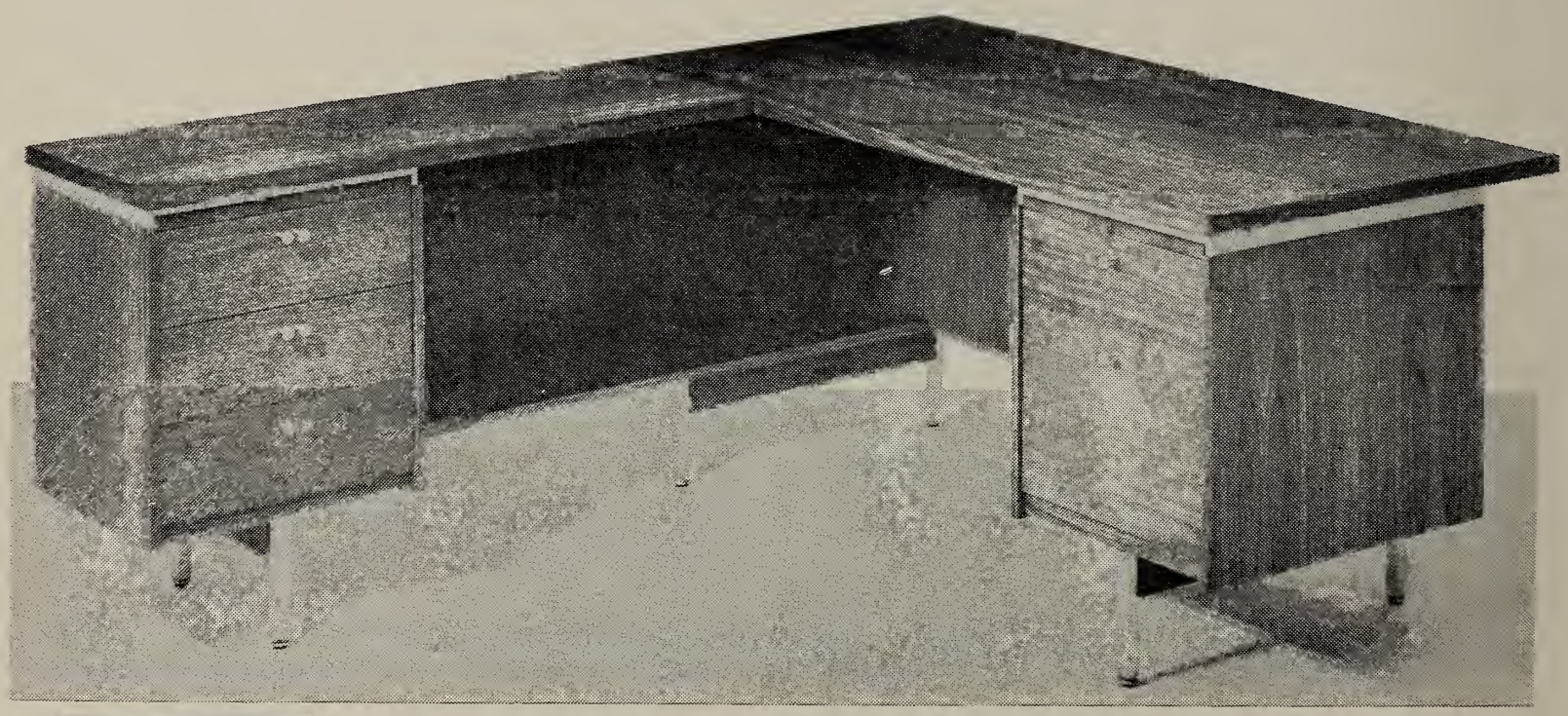
New Drug Score: USA 75, USSR Zero

How important is the patent system to the prevailing health care picture? Here are a few examples. In 48 years, Russia's government-owned pharmaceutical industry has not developed a single new and important drug. In 24 years, thanks in part to patent protection, the American pharmaceutical industry has come up with at least 75 new drug entities. Credit (and a considerable amount is due) must go to a competitive industry that thrives in a competitive economy — motivated by the rewards and contributions to knowledge that the nation's patent system has always guaranteed. Editorial in **GP** (32:5), November 1965.

Benefit vs. Risk — That is the Ratio

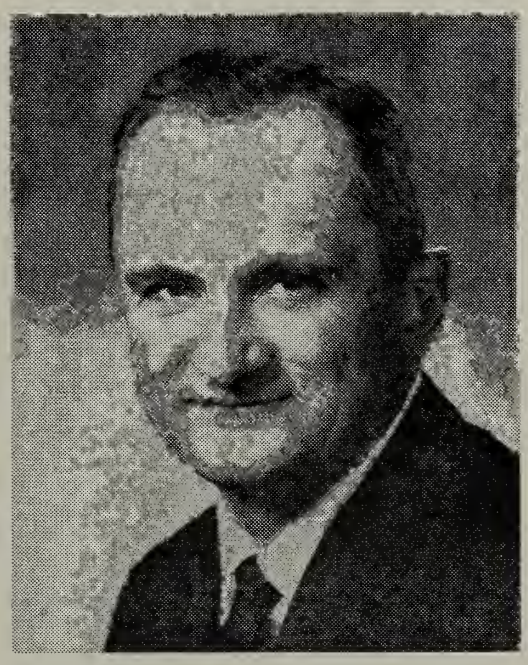
Since there is no such thing as an absolutely safe drug, nor is there a drug that will prove effective in every patient in which it is used, the best we can achieve is a balance; that is, where potential benefit outweighs potential risk. It should be stressed that the benefit-risk ratio is not a constant. The scientist can afford a larger risk in a severe disease for which there is no completely effective therapy, for example, in leukemia, than he can in a relatively benign disorder. FDA Commissioner George P. Larrick in **Emory University Quarterly,** (21:95), Summer 1965.

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PRESIDENT'S PAGE



Dear Members:

It is a common occurrence in our practice of medicine to have women of child bearing age ask us whether or not it is safe for them to take birth control pills. The answer to such a problem, as of today, is somewhat provocative. It seems to depend on the indications for which the medication is prescribed.

Three California physicians, namely Drs. J. James Whitlaw, V. G. Nola and C. F. Kalman, all of O'Conner Hospital, San Jose, California reported finding a number of young women who experienced menstrual abnormalities or infertility after taking and then discontinuing the birth control pills. Of their reported 17 cases, twelve had taken the pills for contraceptive purposes, while the remaining took the pills in an attempt to overcome infertility or to bring the menstrual cycle to normalcy. They reported that two women became infertile, others failed to menstruate for two months to a year, and others had an irregular menstrual cycle for some time; all this after the pills had been discontinued.

The doctors theorized that in a few women the drugs may block the action of glands that produce the hormones that control ovulation and the reproductive cycle. They further stated that unfortunately we are unable to ascertain whether or not these women will be permanently infertile. They therefore suggested that doctors tell childless women or women who have only one child of the possibility of the pills producing infertility for an unknown length of time.

It, therefore, becomes mandatory that we doctors remain cognizant of the fact that the ever increasing list of new and useful drugs carries with it the added responsibility of shouldering the eventual effects of their use.

Sincerely,

Paul Hohm, M.D.
President, S.D.S.M.A.

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MEDICAL ASSOCIATION

News Notes • Changes • Births • News

Pop's Proverb

It's not what you did; it's the interpretation that gets you into trouble.

NEWS NOTES

Harold J. R. MacDonough, M.D., a specialist in radiology, is now associated in practice with **Drs. P. V. McCarthy** and **Paul R. Leon** of Aberdeen. For the past two years Dr. MacDonough had served as radiologist at Southern Hills General Hospital in Hot Springs, South Dakota.

* * *

Abner Willen, M.D., Clark, South Dakota, recently returned from Washington, D. C. where he served as a consultant to the new division of Public Health Service. He was selected for this three-day consultation program on the basis of his being a practicing doctor who serves as a director of an accredited nursing home.

Dr. Willen explained that the department is attempting to set up guide lines in connection with the new Medicare Law.



Fred Stahmann

FELLOWSHIP WINNER

Fred D. Stahmann, a junior in the Northwestern University Medical School, Chicago, has been awarded a $1,622 fellowship which will enable him to broaden his clinical training by assisting for 11 weeks next fall and winter at a mission hospital on the island of Madagascar.

He is the son of Dr. and Mrs. F. S. Stahmann of Sioux Falls.

Mr. Stahmann will work at the Lutheran Hospital in Manambaro, a small village on the southern tip of the island, a former French colony now known as the Malagasy Republic. It is a 56-bed general hospital with x-ray and laboratory facilities. The hospital was built and is partially supported by the mission division of the American Lutheran Church.

His duties will include assisting at surgery, performing minor procedures and doing dressings. He will treat outpatients, make rounds in the hospital and work in the laboratory.

He received his pre-medical training at Northwestern, then completed two years of medicine at the University of South Dakota before transferring to Northwestern University Medical School. He has completed his clerkship in surgery at Cook County Hospital, Chicago.

* * *

Dr. and **Mrs. Warren Fairbanks** of Vermillion were honored at a reception on March 6th in Vermillion. Friends of the couple hosted the reception to express appreciation for the Fairbanks' many contributions to the Vermillion community. Dr. Fairbanks recently joined the staff of the Veterans Administration Hospital in Sioux Falls.

SAMA REPORT

Mr. Dennis L. Johnson, president of the SAMA Chapter at the University of South Dakota Medical School, indicated a busy, productive year in his 1965-66 report.

Among the projects undertaken by SAMA was a "Big Brother" program whereby the sophomore class seeks to assist the incoming freshmen. A "Medical Career Day" was conducted by the sophomore class on their preceptorships.

Featured speakers at SAMA meetings during the year included G. E. Tracy, M.D., Watertown; Col. John Moncrief, Chief of the Surgical Research Unit, Brooks Army Medical Center, San Antonio, Texas; Hugo Andre, M.D., Vermillion; Capt. Joseph Boyle, also of Brooks Air Force Base; and G. W. Knabe, Jr., M.D., Vermillion.

Other highlights during the year included a picnic, dinner dance, barbecue, and the annual awards banquet.

* * *

Alfred Shousha, M.D., formerly of Hoven, South Dakota, is now associated with Dr. Leo W. Graff at the Britton Medical Center, Britton, South Dakota. Dr. Shousha is a board qualified specialist in obstetrics, gynecology and gynecological surgery.

* * *

The Yankton District Medical Society met February 10, 1966 to hear Richard C. Erickson, Executive Secretary of the South Dakota State Medical Association discuss "Recent Views On The Medicare Program."

* * *

F. J. Gilbert, M.D., formerly of Belle Fourche, has joined the staff of the Veterans Administration Hospital in Fort Meade, South Dakota. Dr. Gilbert was on the staff at Fort Meade in 1952, and had practiced in Belle Fourche since 1953.

A nine month tutorial program in Cardiology, September 15, 1966 to June 15, 1967, will be offered by the Institute for Cardiopulmonary Diseases, Scripps Clinic and Research Foundation, La Jolla, California. The tuition is $1,000. Information may be obtained from the Executive Secretary, Institute for Cardiopulmonary Diseases, Scripps Clinic and Research Foundation, La Jolla, California. It is a formal program of the American College of Cardiology.

* * *

N. J. Sundet, M.D., Kadoka, has been elected to active membership in the American Academy of General Practice.

* * *

M. B. Magtibay, M.D., of Bryant, South Dakota, has announced that he will open an office in Estelline, South Dakota. The office will be open from 9 a.m. until noon on Tuesday, Thursday and Saturday.

AMERICAN MEDICAL ASSOCIATION

February 16, 1966

Arthur A. Lampert, M.D.
616 Quincy Street
Rapid City, South Dakota 57701

Dear Doctor Lampert:

Recently, Dr. F. J. L. Blasingame, Executive Vice President of the Association, brought to the attention of the Board the fact that you have completed your "tour of duty" with the Department of Health, Education, and Welfare. He told the Board how helpful you have been in the interest of medicine.

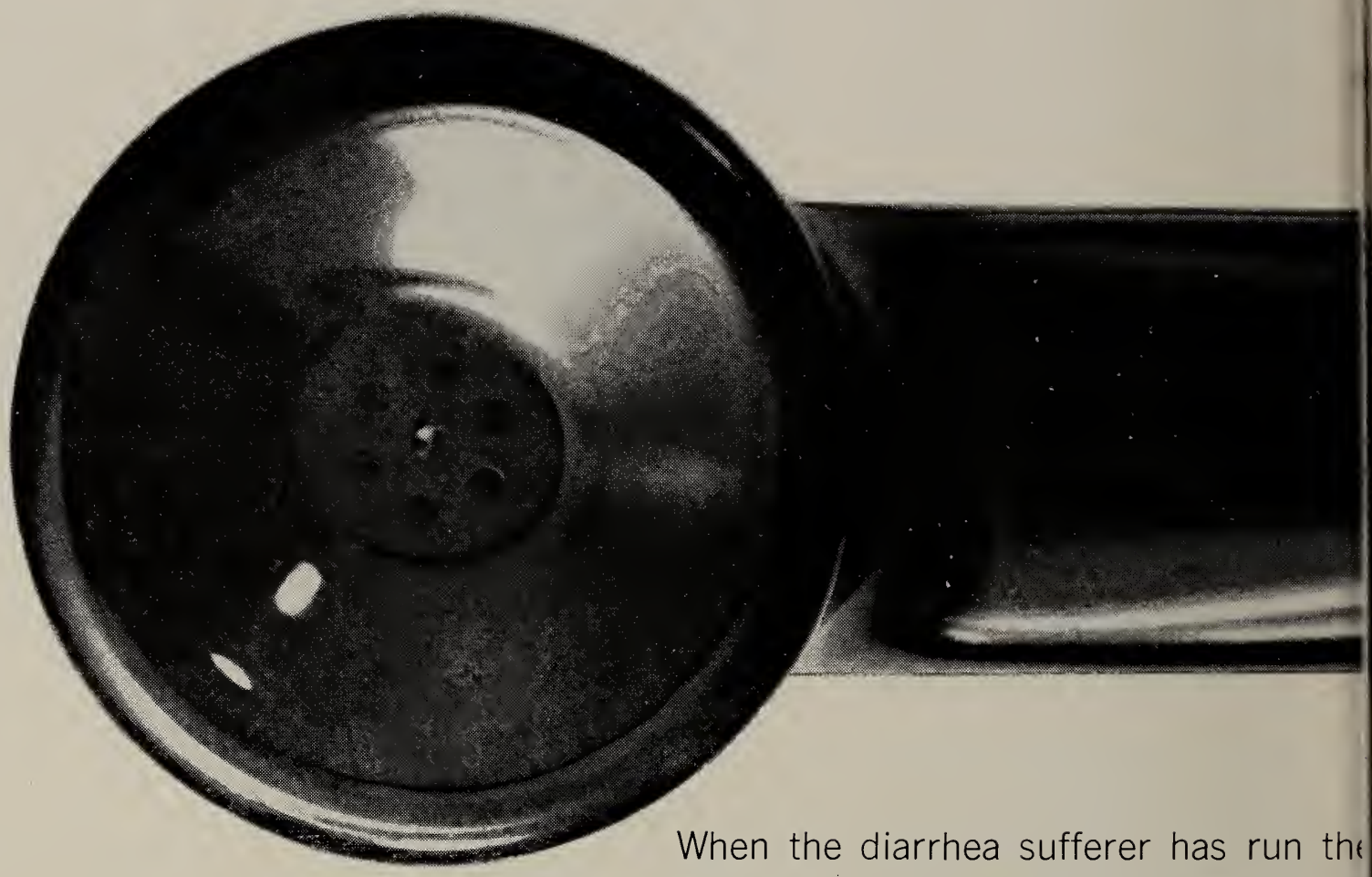
In behalf of the Board of Trustees, I should like to express the gratitude of the American Medical Association for your efforts and the personal sacrifices involved in serving as an advisor to the Social Security Administration during these past few months.

From all reports received, your counsel and advice to Secretary Gardner, Mr. Ball, Mr. Hess, and others have been of great value in providing government with an understanding of some of the more important problems that face physicians who will practice under the law. By so doing you have served medicine well.

Sincerely,

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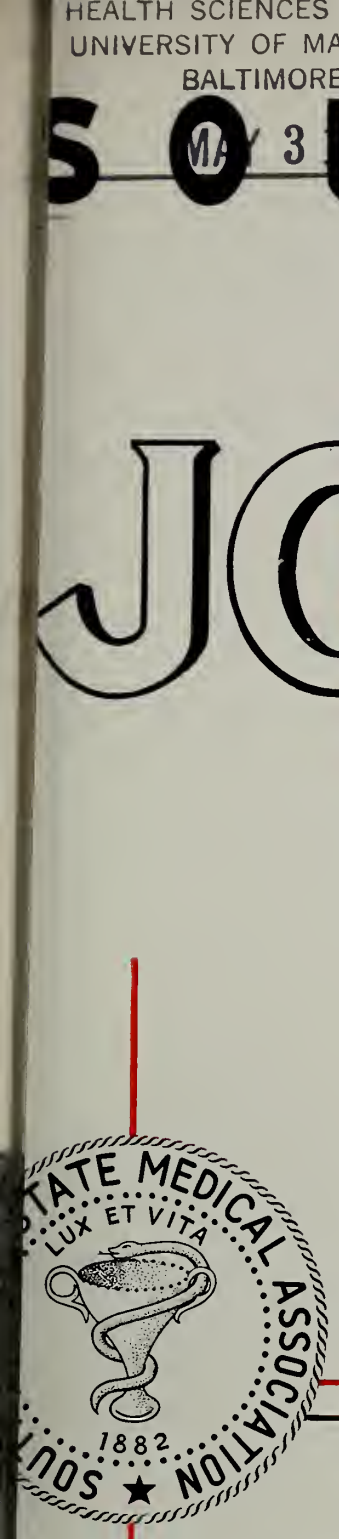
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JOURNAL OF MEDICINE

v. 19 #5

MAY • 1966





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**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **May, 1966** **Number 5**

CONTENTS

The Use of Amniocentesis in Hemolytic Disease of the Newborn . . 17
M. G. Mutch, Jr., M.D.; Barry T. Pitt-Hart, M.B., Ch.B.;
Marilyn Barnett, B.A., M.S., M.T. (A.S.C.P.)

Clinicopathological Conference — Sioux Valley Hospital 22
John F. Barlow, M.D.; Vincent K. Cutshall, M.D.

PathCAPsule — Triiodothyronine (T-3) Uptake, a Method of
Thyroid Function 30

Deadwood Doctor 32
Frank S. Howe, M.D.

Letters 37

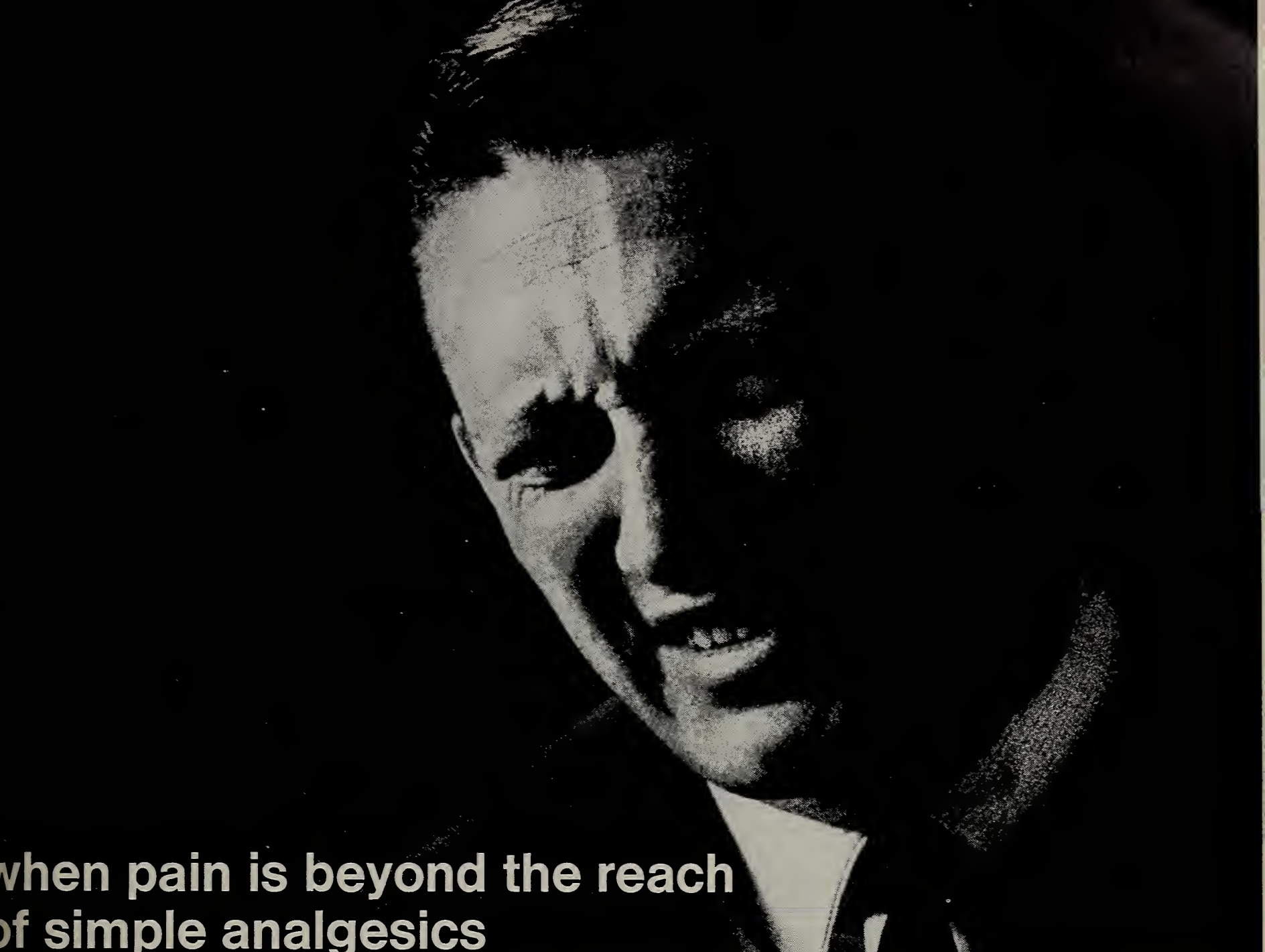
A Tired American Gets Angry 39
Alan C. McIntosh

President's Page 40
Paul Hohm, M.D., Huron, S. Dak.

This Is Your Medical Association 41

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1. Collective studies, Department of Medical Research, Winthrop Laboratories.

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THE USE OF AMNIOCENTESIS IN HEMOLYTIC DISEASE OF THE NEWBORN

By

M. G. Mutch, Jr., M.D., Barry T. Pitt-Hart, M.B., Ch.B., Marilyn Barnett, B.A., M.S., M.T. (A.S.C.P.)

Sioux Falls, South Dakota*

In 1956, Bevis[8] described the value of spectrophotometric examination of liquor amnii. Since then many others have confirmed the reliability of the relationship of certain amniotic fluid pigments to the presence of erythroblastosis fetalis in utero.

During the past few years, and especially during the last 12 months, many papers have been presented on the role of amniocentesis,[2, 4, 15] spectrophotometric analysis of amniotic fluid,[6, 7, 9, 1] and intrauterine transfusion[10, 11, 12, 13] in the treatment of erythroblastosis fetalis. This paper is to show that these procedures have been of definite help in the routine management of Rh incompatibilities in an obstetric practice at the community hospital level.

The safety of amniocentesis as an obstetric procedure is attested to by Goodlin[14] in 600 cases without complication, and Liley[5] with three cases of amnionitis in 1600 cases. An amniocentesis should be performed on every pregnant woman with an indirect Coombs titer of 1:8 or more. An indirect Coombs test is performed on all Rh negative women, those with a previous history of blood transfusion, a previous erythroblastotic infant, or an infant with a history of neonatal jaundice. The amniocentesis is performed between the 29th and 32nd week, and at 2 week intervals when indicated.

MATERIALS AND METHODS

The amniocentesis is done in the office and a tray consisting of the following items is used:

- 1 #20 spinal needle with stylet
- 1 (2 cc) syringe
- Sterile towels
- cotton balls
- 1 #25 needle
- 3 (10 cc) syringes
- sterile gloves
- sterile brown jar for amniotic fluid

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Leopold's maneuver is used to determine the fetal position, and a site opposite the fetal small parts is selected for the puncture (Fig. #1 and Fig. #2). Queenan[4] advocates the site of the puncture at the nape of the neck; however, we feel that this is technically a more difficult area. The placenta is located by the concept that the fetus faces its placenta, and utilization of the placental souffle and palpation. It is important that the patient's bladder be empty. The site of injection is infiltrated with 1% carbocaine. Aspiration is performed using a clean 10 cc syringe. If no fluid is obtained, another site must be chosen. If blood is withdrawn, the needle is probably in the placenta and another site should be chosen. If contamination of the

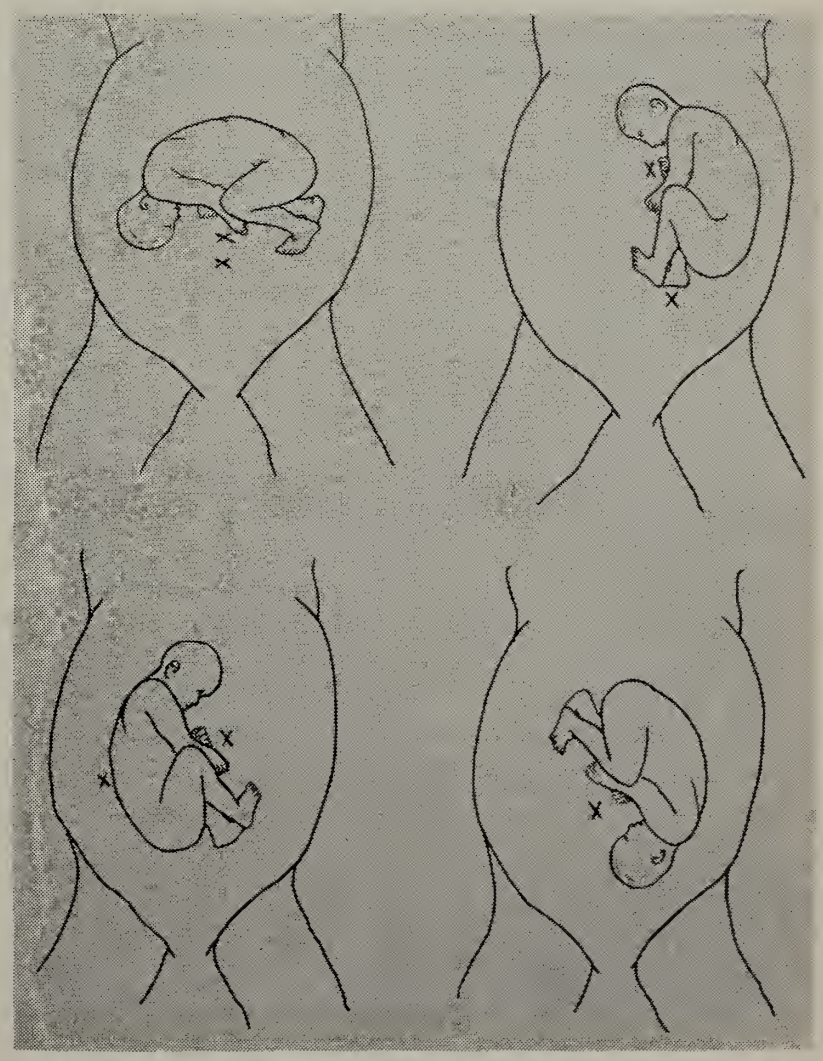


Fig. 1 Sites for amniocentesis.

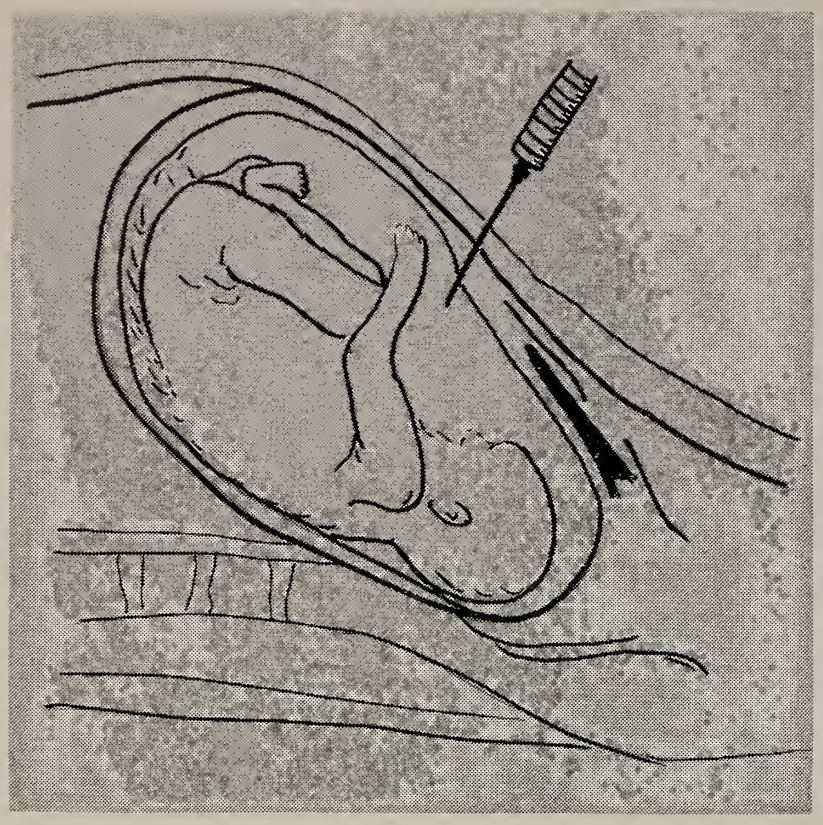


Fig. 2 Amniocentesis with needle into amniotic cavity.

amniotic fluid by blood occurs, another amniocentesis should be performed no sooner than 10 days. Ten cc of amniotic fluid is withdrawn, placed immediately in a brown bottle and sent to the laboratory.

SPECTROPHOTOMETRIC ANALYSIS:

The specimen is centrifuged at 3000 rpm for 20-30 minutes. If the fluid is cloudy, filtration is performed, and the supernatant recentrifuged. Occasionally the fluid is turbid and cannot be cleared either by centrifugation or by filtration. This is clinically not significant, as the infants from these cases have not been affected.[2] The centrifuged sediment is examined to determine the infant's sex by means of the Barr bodies. The supernatant fluid is examined using the Beckman D U spectrophotometer with readings of the percentage transmission at various wave lengths from 350 Mu to 700 Mu. The percentage transmission is converted to optical density, a logarithmic derivative, which is then plotted as the ordinate on semi-log graph paper. The wave length is the abscissa.

Many authors have confirmed the reliability of the relationship of certain amniotic fluid pigments to the presence of erythroblastosis fetalis. The most reliable method at present is spectrophotometric analysis of the amniotic fluid. Liley[5] has compared his results using spectrophotometric analysis and quantitative evaluation of the bilirubin and states the former is more reliable in predicting the severity of erythroblastosis fetalis in utero, and in the incidence of stillborn infants. He states that the coloring is due

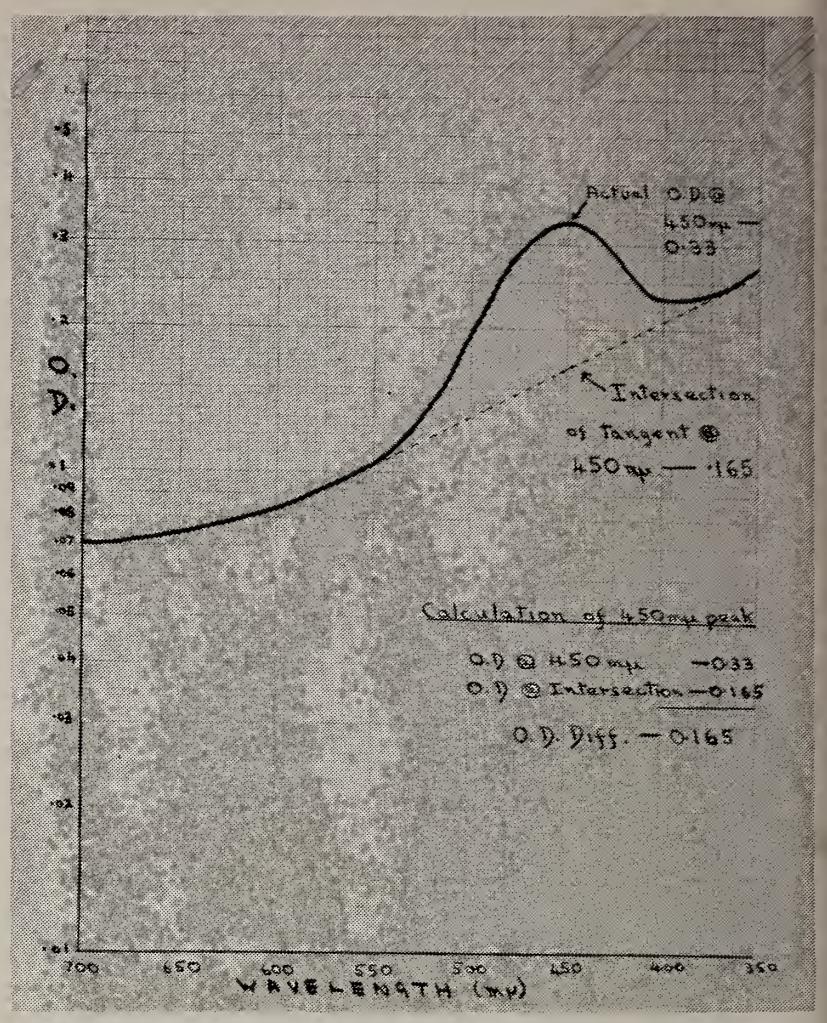


Fig. 3 Calculation of the Optical Density Difference at 450 Mu.

to seven pigments, one of which is destroyed in fifteen seconds by ordinary light.

The spectral absorption curve of normal liquor amnii is approximately a straight line from about the 365 Mu to 600 Mu when plotted on semi-logarithmic paper. In hemolytic disease there is a deviation or peak centered at 450 Mu, the size of which can be related to the severity of the hemolytic disease. There are other less consistent peaks, the main one being at 415 Mu which is due to oxyhemoglobin. The optical density difference at 450 Mu, which has been shown by Liley and others to be the significant variable, is obtained by drawing a tangent to the curves as shown in Figure ♯3. The O.D. difference is the value from where the tangent bisects the 450 Mu line and the peak of the curve. The value obtained is then plotted on a graph of O.D. difference versus the week of gestation. Utilizing the three zones as described by Liley,[2] it is readily apparent that the same O.D. difference is of variable significance depending on the week of gestation. Further, a single determination is of help in zones one and three, but a single determination in zone two is of limited value. Values falling in zone two are repeated at 10-14 day intervals to observe the change. The hemoglobin value and the percentage of stillbirths can be predicted from these three

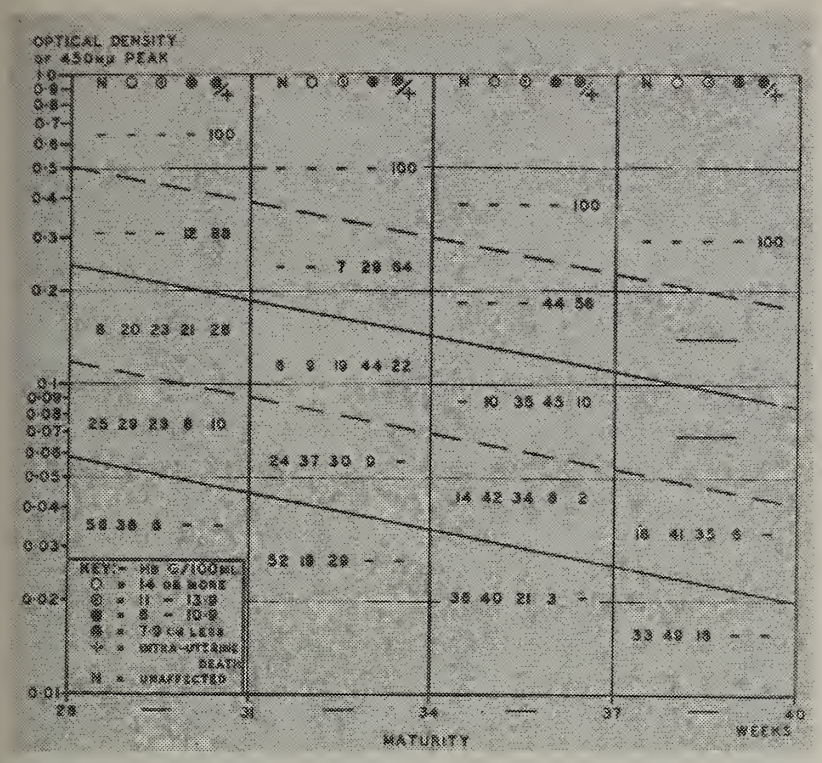


Fig. 4 Percentage probability of the various grades of affliction for the peak size in a single specimen. Maturity in brackets of 3 weeks.

(From Liley: **American Journal of Obstetrics and Gynecology** 86:485, 1963, The C. V. Mosby Company, St. Louis. Reprinted with permission).

zones.[1, 3] Fig. ♯4. The following four cases indicate some of the problems involved.

Case ♯2074 Mrs. C. B., age 38, para 6106, L.M.P. Aug. 4, 1964, E.D.C. May 10, 1965. Mrs. C. B. delivered 4 term infants between 1951 and 1956. In 1960 she had a female, 6 lb. 9 oz., which required one exchange; in 1962, a term male, 7 lb. 3 oz., which required no exchange. In 1964 at 6 months, a male hydropic infant survived a few moments. The husband is homozygous, Rh positive.

She was first seen at 32 weeks and an amniocentesis was attempted which failed. An amniocentesis at 33 weeks showed an O. D. difference of .175 which placed her on the line between zone 2 and zone 3. At 36½ weeks an amniocentesis showed an O.D. difference of .424, Fig. ♯5. This was a sharp rise placing her well into zone number 3. Even though the infant was of small size, the hemoglobin was estimated to be below 6 grams and the infant was delivered by low cervical Cesarean section after 2 days of I.V. Pitocin. At delivery the cord hemoglobin was 4.6 grams %. The infant received 2 exchange transfusions, but expired after 4 days. The infant showed the classic signs of a 16-18 Trisomy. Had this infant been allowed to go for a longer period of time in utero, it undoubtedly would have been stillborn. Thus, the amniocentesis did give us information indicating prompt delivery.

Case ♯2098 Mrs. J. N., age 32, para 2002, L.M.P. Sept. 9, 1964, E.D.C. June 17, 1965. In 1957 she

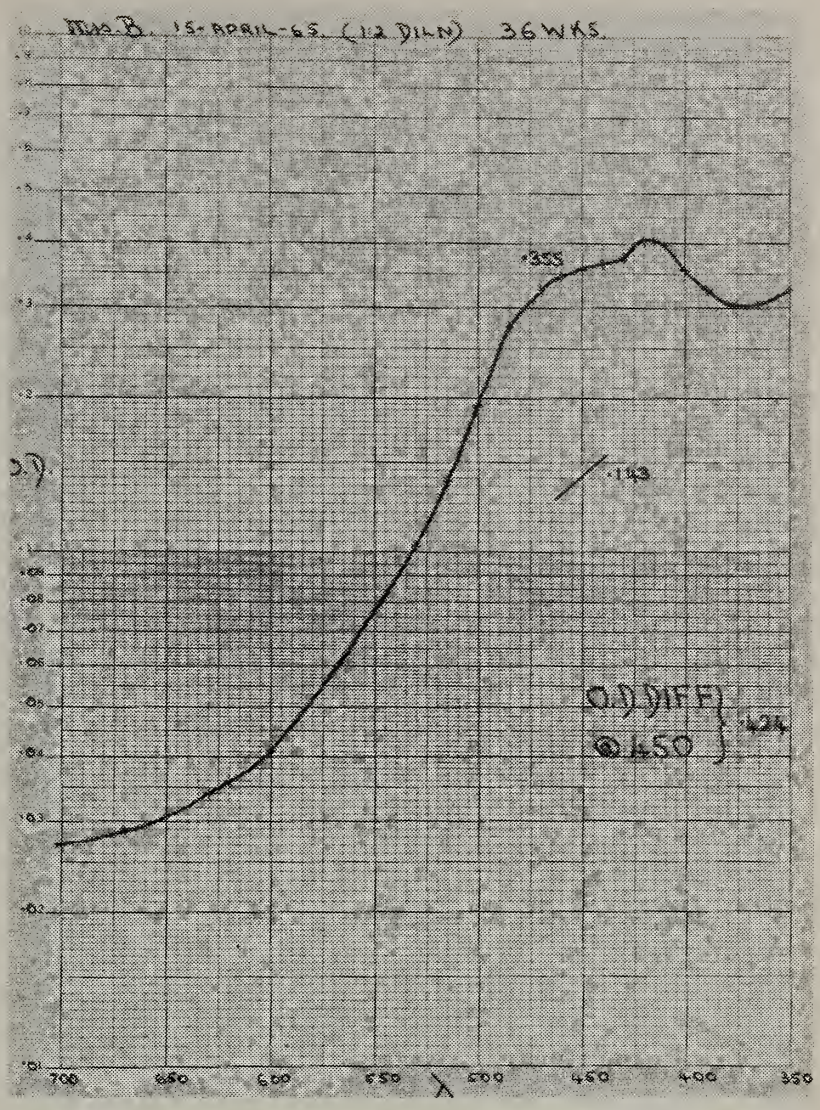


Fig. 5 Curve showing O.D. Difference at 36 weeks — Mrs. B. (Note 1:2 dilution factor).

had a term infant 8 lb. 3 oz., no jaundice; in 1959 a term infant, weighing 6 lb. 3 oz., and hemoglobin of 9.4 grams %, which required 2 exchanges.

She was first seen for this pregnancy at 32 weeks and an amniocentesis placed her in lower zone 2. (O.D. difference .052) A repeat amniocentesis at 35½ weeks showed an O.D. difference of .92 which placed her in upper zone 2. The cord hemoglobin was estimated to be between 9 and 10.4 grams %. Because of the sharp rise in the O.D. difference, an induction was carried out on 5-17-65 and a 7 lb. 8 oz. infant was delivered with a cord hemoglobin of 9.8 grams%. The infant required 2 exchanges and did well. Had the infant been allowed to go two weeks longer as planned, we would have had a very sick infant, or a stillbirth.

Case ♯2254 Mrs. V. A., age 28, para 4104, L.M.P. Nov. 6, 1964, E.D.C. Aug. 13, 1965. Mrs. V. A. had a 4 months spontaneous abortion in 1956 followed by 2 normal term infants in 1957, and 1959. In 1961 a 6 lb. 8 oz. infant with erythroblastosis fetalis expired after ½ hour. In 1962 an induction at 38 weeks produced a 6 lb. 8 oz. infant which required 2 transfusions and did well.

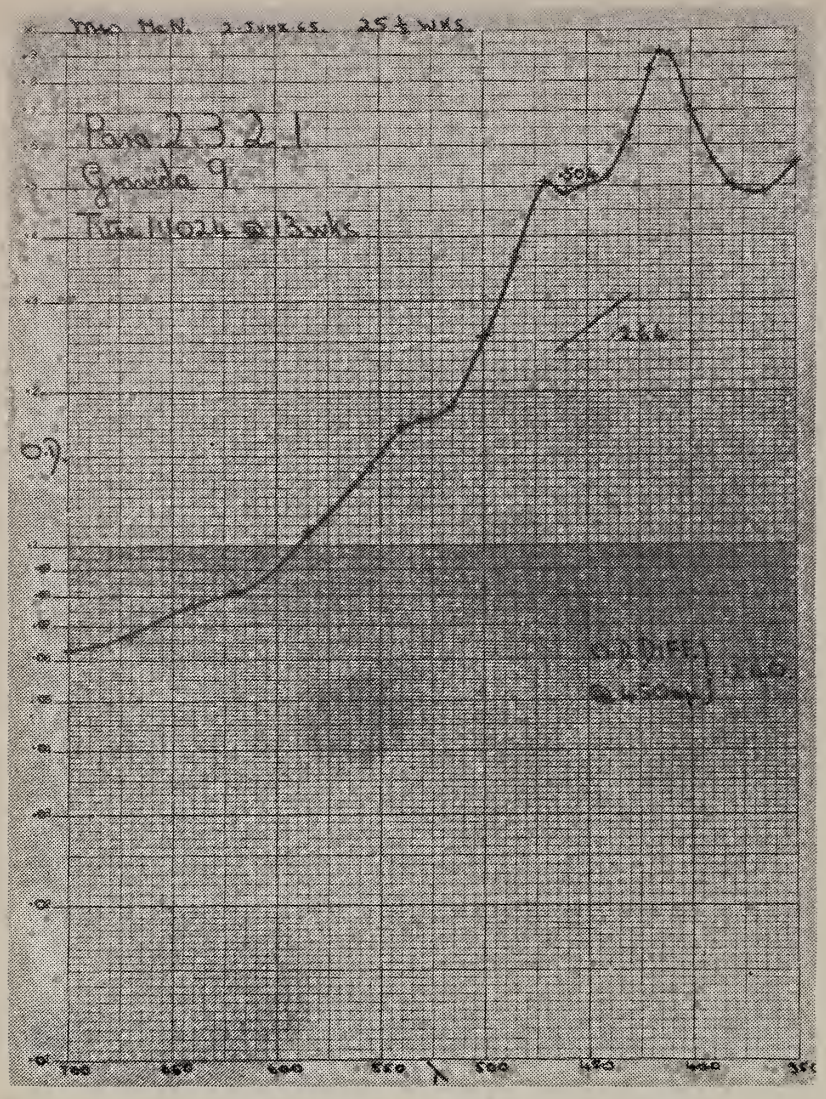


Fig. 6 Curve showing O.D. Difference at 25½ weeks — Mrs. McN.

She was first seen on July 17, 1965, at an estimated 36 weeks of gestation. She had received 5 days of I.V. Pitocin induction with no appreciable progress. Clinically the cervix was not ripe, and the infant was very small. An indirect Coombs titer was 1:512. Amniocentesis placed her in lower zone 2 (O.D. difference .049). She was sent home and an amniocentesis 10 days later showed an O.D. difference of .027. This was a definite fall placing her in lower zone 1, and it was felt that the infant should be allowed to go to term. On 8-10-65 a spontaneous delivery produced an infant weighing 6 lb. 8 oz. with a cord hemoglobin of 12.8 grams %. The infant required 2 exchange transfusions. This is a case of a small infant which was being induced on the basis of history. An amniocentesis gave the additional information necessary to avoid the problem of erythroblastosis fetalis and prematurity.

Case ♯2071 Mrs. McN., age 34, para 3321, L.M.P. 12-7-64, E.D.C. 9-13-65. Mrs. McN. delivered in 1953 a term infant, 7 lb. 8 oz.; in 1954 a term infant, 6 lb. 5 oz., requiring an exchange transfusion at 2 weeks, expired at 10 weeks. In 1955 a 6 weeks spontaneous abortion; in 1957 35 weeks stillborn from erythroblastosis fetalis by Cesarean section. In 1958, 10 weeks spontaneous

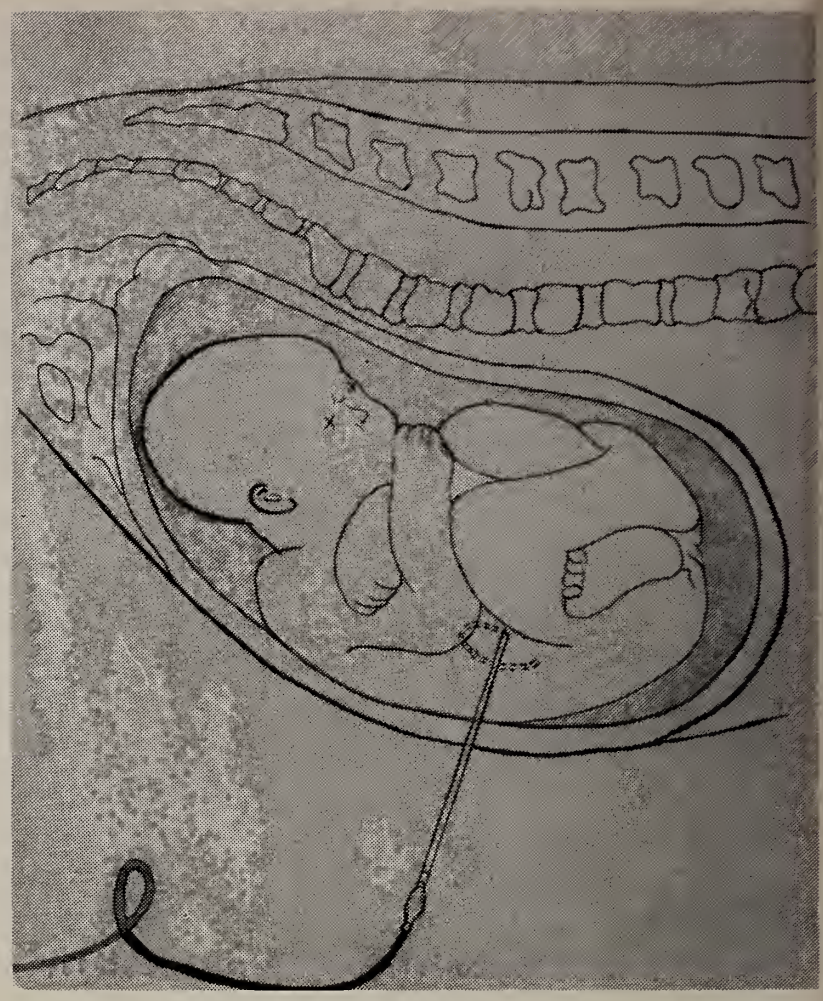


Fig. 7 Intrauterine Transfusion.

abortion, in 1959 at 33 weeks by Cesarean section an affected infant 4 lb. 4 oz. which expired the sixth day. In 1961 at 26 weeks, a Cesarean section for abruptio placenta.

She was first seen for this pregnancy at 13½ weeks with an indirect Coombs titer of 1:1024. An amniocentesis at 25 weeks, (Fig. ♯6), showed an O.D. difference of .240. A repeat at 27½ weeks showed a rise to .324. This placed her in zone 3 and at 28½ weeks an intrauterine transfusion was done (Fig. ♯7). The transfusion was successful, 80 cc of packed red cells were injected into the infant's peritoneal cavity; however, by X-Ray the baby was markedly hydropic. One hour after the transfusion, heart tones ceased. At approximately 27½ weeks the mother stated she noticed a decrease in fetal movements. On 7-5-65 a macerated female infant was delivered by low cervical Cesarean section. Autopsy showed no internal damage from the needle and the needle site was visible in the right flank.

This woman had an unfortunate obstetric history and as can be seen (Fig. ♯4), had no chance for a surviving infant unless an intrauterine transfusion was performed. Fig. ♯8 shows the composite view of the 4 cases which have been discussed.

COMMENT

Amniocentesis is an important adjunct for evaluation of the in utero status of the infant with potential hemolytic disease, since routine

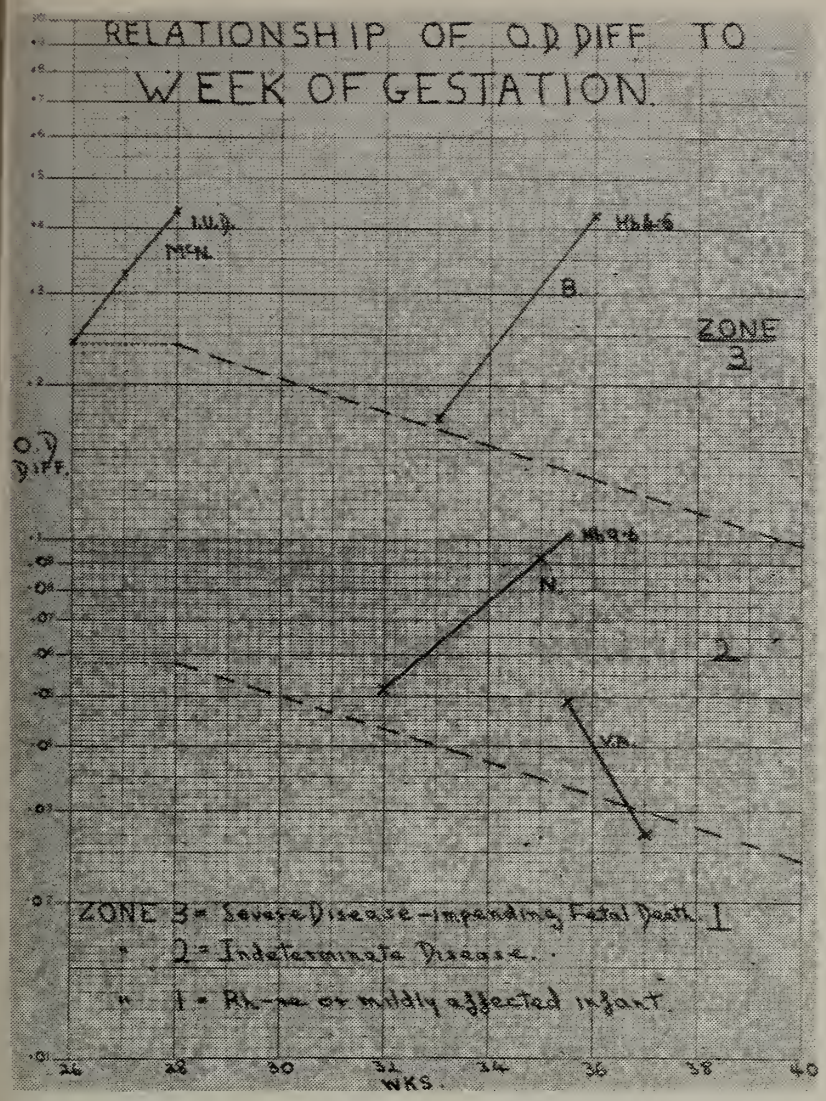


Fig. 8 Composite Chart of Cases Reported.

premature induction for erythroblastosis fetalis has resulted in the loss of many infants which might have survived had the pregnancy been allowed to continue longer. From the literature and our experience of 10 cases, and 21 amniocenteses, the following recommendations are made:

1. An amniocentesis should be done on all patients with a titer of 1:8 or more. The titer is used to indicate sensitization, not the severity of the hemolytic disease. The amniocentesis should be done between the 29th and 32nd week of gestation, depending on the past medical history, earlier if indicated.

2. An O.D. difference placing the infant in Liley zone 1, should be allowed to go to term. However, facilities should be available for an exchange transfusion, as an occasional infant will require treatment.

3. An O.D. difference placing the infant in zone 3 prior to the 34th week is a candidate for an intrauterine transfusion. After 34 weeks the patient should be delivered by whatever means is most expedient.

4. An amniocentesis should be repeated in 10-14 days if the O.D. difference is in zone 2. Delivery should be based on the trend shown. If the O.D. difference rises to the upper half of zone 2, delivery should be accomplished after 34-35 weeks. If the O.D. difference is in the lower half of zone 2, the patient should be allowed to go to 38 weeks before delivery is accomplished. The possibility of intrauterine death in this latter group is almost nil.

5. While the O.D. difference is relatively accurate in prediction of intrauterine death, it does not tell whether the infant will require exchange transfusions; therefore, facilities for immediate exchange transfusions must be available.

SUMMARY

The spectrophotometric examination of amniotic fluid as an obstetric tool is practical and useful in reducing fetal mortality in hemolytic disease. A suggested outline for the utilization of this procedure has been presented. Four cases have been used to illustrate some of the practical problems that can be solved by this procedure.

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CLINICOPATHOLOGICAL CONFERENCE - SIOUX VALLEY HOSPITAL

From the Intern and Resident Teaching Conferences of the Sioux Valley Hospital, Sioux Falls

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Pathologist - Editor

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Discusser

A 25-year old Caucasian female was referred to the hospital because of repeated seizures over previous few hours.

Two years before she had been seen for cardiac evaluation. She gave a history at that time of four classical episodes of active rheumatic fever before the age of fourteen. She did well as a bookkeeper until age twenty-three, when she noted slowly progressive dyspnea on walking one block or climbing a flight of stairs. She never had orthopnea, paroxysmal nocturnal dyspnea, angina, chronic cough, hemoptysis, or gross edema of the ankles although she did notice mild ankle swelling after a long hard day. Physical examination revealed a pulse of 80 and regular B/P was 160/50/0. The carotids were bounding and radial pulses were of the "water-hammer" type. The neck veins were not distended and the chest was clear. The heart was markedly enlarged to the left with a predominantly left ventricular heave. The rhythm was regular. There was a grade II ejection systolic murmur at the left sternal border and a grade IV early diastolic blowing murmur at the left sternal border. The second heart sound was closely split with P_2 being much louder than A_2. There was a moderately loud apical diastolic rumble. The first heart sound was not accentuated and there was no gallop or rub. The liver was not felt and there was no edema. The electrocardiogram showed normal sinus rhythm and left ventricular hypertrophy, with strain. There was no evidence of right ventricular hypertrophy or P-mitrale. Cardiac fluoroscopy and kymography disclosed marked cardiomegaly chiefly of the left ventricle with fairly normal pulmonary vasculature. The aorta was somewhat widened and markedly pulsatile in both ascending and descending portions. She was digitalized and placed on oral penicillin 250,000 units twice daily.

During the next two years she did well with increase in her exercise tolerance but reported that she had severe generalized headaches, preceded 10-15 minutes beforehand by scotomata and faintness for about a year. These occurred twice per week and could be aborted by aspirin if taken immediately at the onset of visual disturbance. Over the two weeks preceding the final admission, she had some difficulty with memory, blurring of vision, nausea, and increasing severity of the headaches described above. She had recently been started on Diuril and also Enovid as an oral contraceptive because she was planning on marriage in the immediate future. Childbearing was deemed inadvisable due to her cardiac condition. Four days prior to admission she had three generalized convulsions which were more marked on the right. The only family history of convulsive disorder was that fraternal uncles had had convulsions as children. She was seen on the day of admission because of convulsions which were generalized but more marked on the right. The head and eyes turned to the right. She was alert, oriented, and cooperative. B/P was 150/0. Extraocular movements were normal. Pupils were round and equal and reacted briskly. Fundi were normal. Reflexes and movement were equal and reacted briskly. Plantar response was flexor bilaterally. The cardiac examination was unchanged. She was given 175 mgs. of Dilantin and 1½ grains of Luminal and referred to the hospital.

Laboratory work during hospitalization revealed a spinal fluid which was grossly and uniformly bloody with an initial pressure of 240 mm. of H_2O. With removal of 2 cc. the pressure came slowly down to 140-160. The fluid was xanthochromic with 75,000 RBC/cu.mm. and 190 WBC/cu.mm. with 99% polys and 1% mononuclear. Protein was 452 mg%. LDH was 158 units. Colloidal gold was 4444322100. Culture of spinal fluid was negative. Hgb was 10.7 gm%, RBC 4.40 million/mm^3, Hct 36%. MCH 24.5 micromicrograms, MCV 83 cubic micra, and MCHC 30%. Urinalysis showed specific gravity of 1.010, pH 5.5, 3-5 WBC/HPf, and numerous epithelial

cells. Antistreptolysin titer 100 Todd units. Serology nonreactive. Erythrocyte sedimentation rate 57 mm/hr., FBS 90 mg%, BUN 15 mg%, Na 140 meq/L, K 4.2 meq/L, C1 105 meq/L, CO_2 25.4 meq/L. X-rays of the skull were negative. Chest film showed the heart to be enlarged in the region of the left ventricle. The transverse diameter was 14.5 cm. which was roughly 10% over normal predicted for her height and weight. The pulmonary fields were clear. ECG showed left ventricular hypertrophy with strain, first degree A-V block and poor R wave progression in early precordial leads, suggestive of past anterior myocardial damage. Prominent U waves were present. The electroencephalogram was abnormal with slow wave foci in frontal area, maximum on the left.

The patient's hospital course was characterized by headaches and vomiting but she remained oriented without definite localizing neurologic signs except slightly increased reflexes on the right. She had intermittent fever up to 102.4°. On the seventh hospital day, respirations suddenly ceased with rapid rise in pulse and decrease in blood pressure and she expired.

CLINICAL DISCUSSION

Dr. V. K. Cutshall*: The chief complaint is that of seizures of a few hours' duration in a young female. Two years previously she had been seen for cardiac evaluation. There was a well-established history of rheumatic fever with four classical episodes before age 14. She did well until age 23, then noted slowly progressive dyspnea on slight exertion. There was no hemoptysis, cough, angina, orthopnea, nor paroxysmal nocturnal dyspnea. On examination two years before admission a blood pressure of 160/0 was noted with radial pulses of "water-hammer" type and bounding femoral pulses, indicating a severe, "wide-open" aortic insufficiency. "Water-hammer" or Corrigan pulse are names used to denote the pulse resulting from an overdistended ventricle that ejects an abnormally large stroke volume. Also any abnormality such as an A-V fistula or patent ductus, where there is a loss of blood from the arterial to the venous system will cause a wide pulse pressure as well as noncardiac conditions such as hyperthyroidism or severe anemia. Capillary pulsations were not mentioned although there is often a "capillary blush" with a high systolic and a low diastolic pressure. The heart was markedly enlarged with left ventricular prominence, the type of enlargement seen in severe aortic insufficiency although also seen in aortic stenosis. There was a grade II ejection systolic murmur along the left sternal border. The protocol does not state whether the murmur extended into the aortic area or radiated into the neck. There was a grade IV early diastolic murmur along the left sternal border. In aortic insufficiency the most common place to hear this murmur is along the left sternal border. It also may be heard in the aortic area and can be followed down to the apex. In general, diastolic murmurs of this quality are difficult to hear. A relatively severe aortic insufficiency may cause only a Grade I or Grade II murmur. The second heart sound was closely split, P_2 much louder than A_2. In a young person, P_2 is normally louder than A_2. These change between ages 35 and 45 when they become equal, and in later life A_2 becomes more predominant. The marked predominance of P_2 over A_2 at age 25, however, leads me to consider an increased pulmonary pressure. There was a moderately loud apical diastolic rumble indicating one of two possibilities: a diastolic murmur of mitral stenosis or an Austin-Flint murmur. I prefer to choose the former. We have an established history of rheumatic fever and I think the patient has resulting valvulitis. I do not think of a mitral murmur as being functional in origin in this case because we should consider combined valvular lesions more likely in patients with rheumatic heart disease. This patient was digitalized, and many times after digitalization an Austin-Flint murmur will disappear. In fact, this is one of the ways to distinguish between an Austin-Flnt and a true organic murmur. Thus, for two reasons, I prefer to think of this murmur as resulting from a mitral lesion rather than just an Austin-Flint murmur from aortic insufficiency, e.g., the murmur did not disappear with digitalization, and combined valvular lesions are very common in rheumatic valvulitis.

The first heart sound was not accentuated. There was no gallop or rub. The liver was not palpable and there was no edema. There was no mention of palpable splenomegaly. ECG showed an anticipated marked left ventricular hypertrophy with strain. There was no evidence of right ventricular hypertrophy or P-mitrale, tending to rule against a severe mitral stenosis but not excluding a mitral lesion per se. Cardiac fluoroscopy and kymography confirmed the electrocardiographic diagnosis of left ventricular hypertrophy with fairly normal pulmonary vasculature. This also tends to exclude retrograde pulmonary hypertension from severe

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* Internist, Sioux Valley Hospital.

mitral stenosis. The aorta was wide and markedly pulsatile in both ascending and descending portions, a common observation in severe aortic insufficiency.

The patient was digitalized and placed on oral penicillin, 250,000 units daily which is certainly an adequate prophylactic measure against recurrent rheumatic fever. All doctors should be aware of the fact that any child or young adult who has had rheumatic fever should be placed on penicillin prophylaxis indefinitely. This has been the recommendation of the American Heart Association for years. You wonder when to begin! If you have a patient in his 30's with rheumatic heart disease and no previous prophylactic medication, do you start then? Penicillin is now inexpensive and I don't think there is any excuse for not putting a patient with rheumatic heart disease on penicillin prophylaxis in an effort to prevent future streptococcal infection. However, 250,000 units is an inadequate dose for prophylaxis against endocarditis.

It appears well-established that this patient had rheumatic valvulitis with aortic insufficiency as the predominant lesion when first seen for cardiac evaluation. For the next two years she did well with increase of her exercise tolerance. However, during the second year she had severe generalized headaches, preceded 10-15 minutes beforehand by scotomata and faintness. For the first time now cerebral symptoms appear. You might think of migraine at this point preceded by scotomata and faintness. These headaches were noted to occur twice per week and could be aborted by aspirin if taken immediately. Aspirin is notoriously ineffective in migraine. During the two weeks preceding admission, she had difficulty with memory, blurring of vision, nausea, and increase in severity of headaches. Prior to admission, she had three generalized convulsions, most marked on the right. With a two-year history I feel these convulsions had an organic basis. The day before admission convulsions were generalized and most marked on the right suggesting localization in the left cerebral hemisphere. We always hear the patient looks towards the side of the lesion. I'll ask Dr. Smith to comment on this later.

She was alert, oriented, and cooperative. Blood pressure again showed a wide pulse pressure (150/0). Pupils were equal and reacted briskly. Fundi were normal. Cardiac examination was unchanged and she was given Dilantin and Luminal and referred to the hospital. Her course was precipitous, reaching a climax

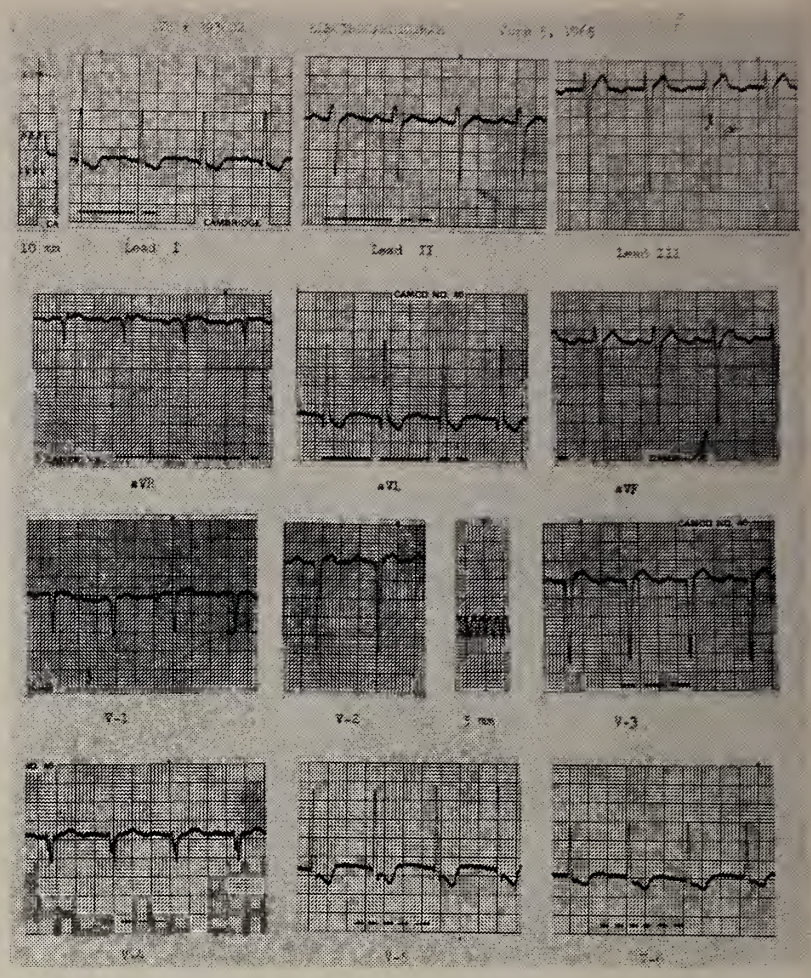


Fig. 1. ECG taken on admission.

within three weeks, although we have evidence that she was having cerebral symptoms for two years. Laboratory work was very helpful: A grossly bloody spinal fluid was found with an opening pressure of 240 mm H_2O dropping to 150 after 2 cc. of spinal fluid was removed. The fluid was xanthochromic with 75,000 RBCs and 190 WBCs/mm^3. Protein was elevated at 452 mg%. LDH was 158 units. Colloidal gold showed a first zone curve but I think in view of the gross blood this is not significant. Spinal fluid culture was negative. Hgb was 10.7 gm%, a mild anemia but significant for a young woman without a history of previous bleeding. Central nervous system hemorrhage alone could not explain a hgb of 10.7 gm%. WBCs were 8,750 and 6,900/mm^3 with a normal differential. This was true in spite of fever. Urinalysis was essentially normal notably lacking any red cells or pus cells. ASO titer was normal at 100 Todd units. However, the erythrocyte sedimentation rate was definitely elevated at 57 mm/hr. Intermittent fever is mentioned but we do not know its duration. Certainly a temperature of 102.4° is significant. Whether this is secondary to cerebral hemorrhage or to a cardiac lesion is uncertain. Dr. Breit, will you comment on the x-rays?

Dr. D. H. Breit*: The skull films are negative. The chest film shows an enlarged heart, pre-

* Radiologist, Sioux Valley Hospital.



Fig. 2. Endocarditis of aortic valve and ventricular endocardium.

dominantly left ventricular, although not a very severe enlargement for the recorded blood pressure. There is no significant enlargement of the left atrium. The lung fields appear clear with little if any evidence of congestion.

Dr. Cutshall: The ECG shows some interesting changes. Lead I shows a very tall R wave with a deep S in lead III. There is marked left axis deviation. The T wave in lead I is diphasic to inverted, compatible with left ventricular hypertrophy. AVR, AVF, and AVL essentially resemble lead I showing the enlargement. There is a noticeable first degree heart block. The PR interval measurement is 0.20-0.22 in this area. Across the chest there are definite and significant changes. First, if we measure the S wave in V2 and the R wave in V5, together they measure a total of 44 mm. This is significant in left ventricular strain. There are no R waves going across V1 and V2. This would indicate an anterior septal infarction pattern. There are prominent U waves which are found normally in patients with about any disease in the standard leads; they usually are not more than ½ mm. They follow the T wave by about 0.02-0.04 seconds and are usually upright though they may be inverted. The duration is usually 0.2 sec. They may be seen in hypertension or left ventricular hypertrophy. They may also be seen in numerous other conditions such as after digitalis or quinidine, and in hypokalemia. The electroencephalogram was abnormal with slow wave foci in the frontal areas, maximal on the left. Dr. Smith, will you comment on the neurologic aspects of the case?

Dr. G. W. Smith*: The spinal fluid blood was that of a spontaneous hemorrhage into either the ventricles or subarachnoid space. The colloidal gold curve certainly is altered if the hemorrhage occurred sufficiently early for the fluid to become xanthochromic. Xanthochromia, incidentally, occurs rapidly. It used to be stated that 12 to 24 hours had to elapse before xanthochromia occurs, but we now know that it can occur in 20 minutes. In one case I did a lumbar puncture on a patient 30 minutes after he sustained a head injury. Spinal fluid was centrifuged immediately and was xanthochromic. This led us to wonder how quickly xanthochromia could occur and we added blood to normal spinal fluid; within 20 minutes there was marked xanthochromia of the supernatant when the fluid was centrifuged. So it is extremely important for the laboratory to centrifuge cerebral spinal fluid within ten minutes after a lumbar puncture if any blood is present or there may always be doubt whether it was a traumatic tap or due to a previous hemorrhage. You should also examine the cells within ten minutes or they may be crenated.

Dr. Cutshall: On the basis of the entire protocol I offer the following diagnoses: First of all, the rheumatic valvulitis is established without question. The aortic insufficiency was severe. There was little aortic stenosis. There was no mention of the murmur radiating into the neck and there was no mention of a thrill. Usually, a severe aortic stenosis would cause these. On the basis that there is a previous existing rheumatic valvulitis, I prefer to diagnose mitral stenosis despite Dr. Breit's comments. Second, there is secondary left ventricular hypertrophy. Third, there is cerebral hemorrhage involving the left hemisphere. Whether this is subarachnoid or intraventricular extension of primary intracerebral hemorrhage is uncertain. I believe subacute bacterial endocarditis with mycotic an-

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* Neurosurgeon, Sioux Valley Hospital.

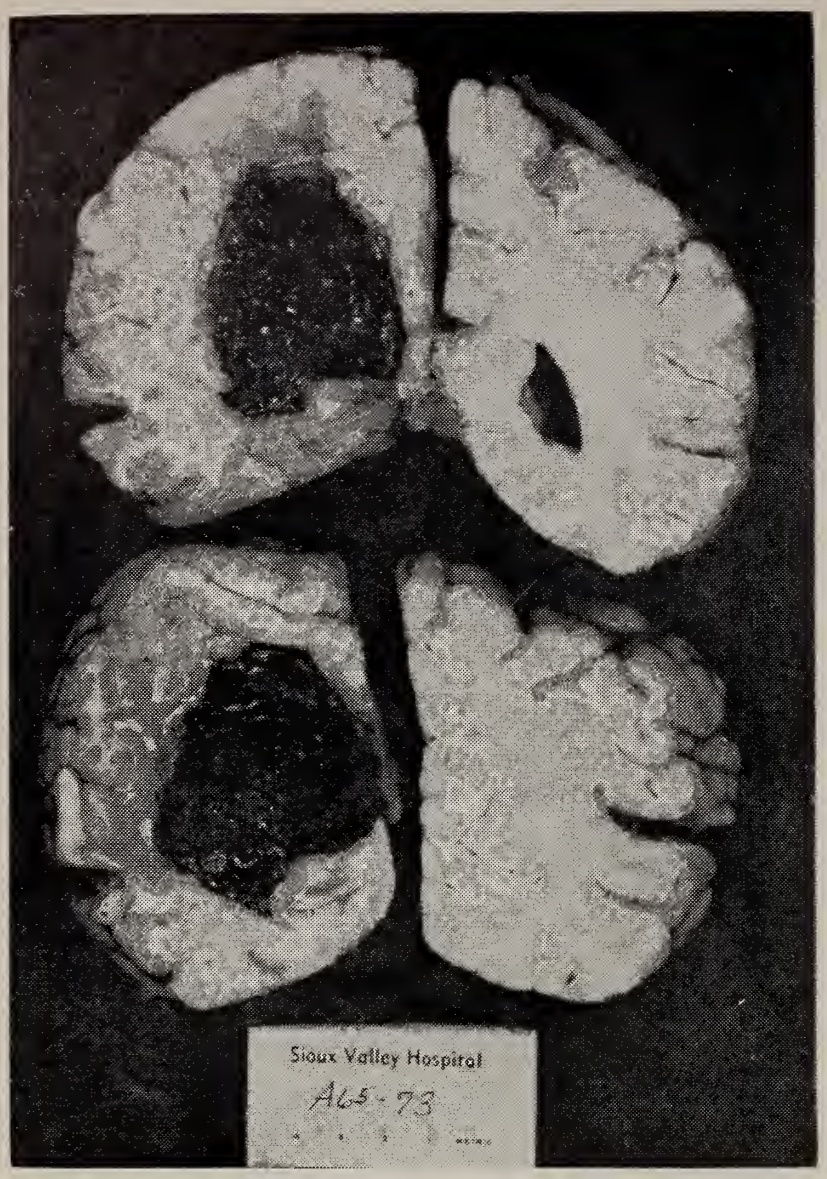


Fig. 3. Massive intracerebral hemorrhage.

eurysm and rupture explain the cerebral symptoms. I do not have blood culture results which would have been very helpful. I'm sure they were left out on purpose. Friedberg* states that if he cannot determine the cause of fever in a rheumatic patient after one week, he institutes antibiotic therapy regardless of what cultures show. Nothing was mentioned about a palpable spleen which is found in 1/2 to 2/3 of the cases, or about petechiae or Osler nodes. I think the laboratory data is wholly compatible with my diagnosis of endocarditis. Leukocytosis does not have to be present. Friedberg states that in his series of cases of subacute bacterial endocarditis over one-third of the patients had a normal white count. Nothing was mentioned about histocytes from ear lobe capillary blood but they would not be diagnostic anyway. There was no monocytosis. Anemia and elevated sedimentation rate are compatible with endocarditis. The valves that are most likely involved in subacute bacterial endocarditis are mitral and aortic. It is often said that the most severely damaged valves are least affected with endocarditis while the ones that are not so severely

* **Diseases of the Heart,** C. K. Friedberg, Second Edition, W. B. Saunders Co.

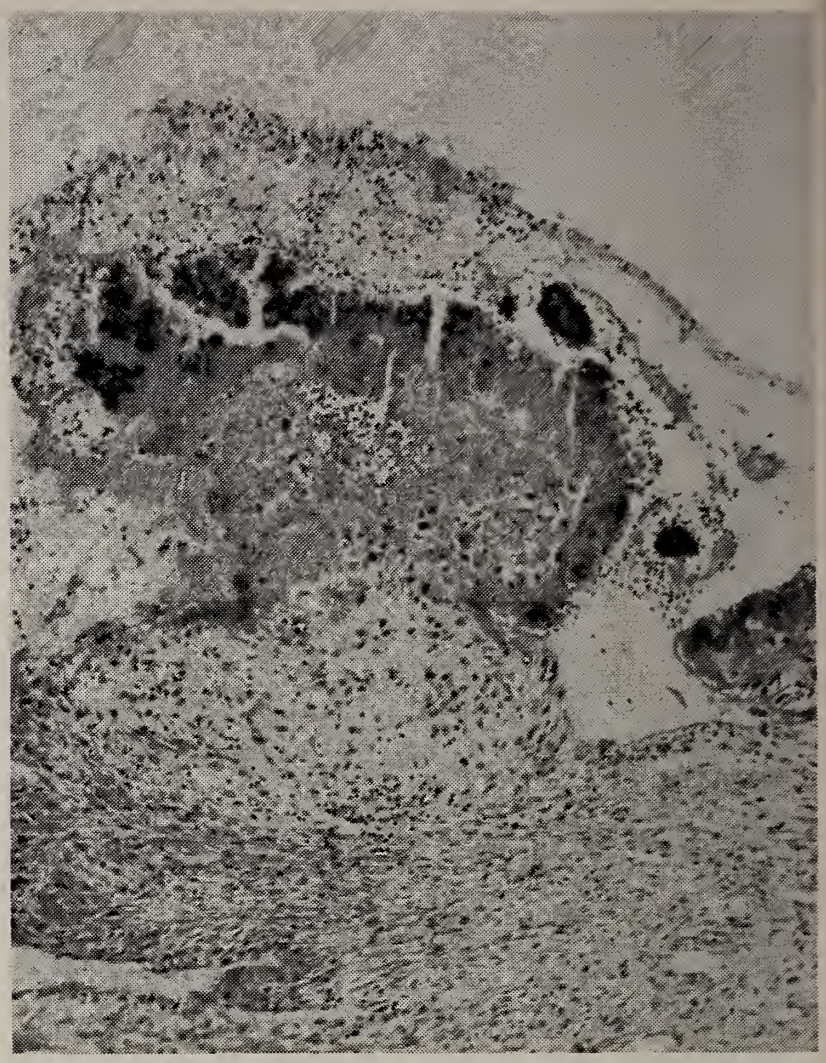


Fig. 4. Bacterial vegetation of mural endocardium.

damaged are more commonly involved. I feel the mitral valve may be involved. Of course, emboli could easily come from either valve. Dr. Smith, what do you feel about the neurologic symptoms, especially about the eyes turning to the right? Don't they usually turn toward the lesion?

Dr. Smith: The patient first had seizures at age 25. This is within the age group where idiopathic epilepsy most often occurs. However, there is one very significant fact which indicates that an organic lesion must be strongly considered and that is that these were localized: they were right-sided seizures.

To answer your question relative to the eyes turning in the direction of the lesion: this is true of non-seizure eye deviation. If there is a tumor or hemorrhage present on the left, not producing seizures, then the eyes will turn to the left, but if you have a lesion in the left hemisphere that is producing a seizure, during the seizure the eyes will turn in the direction of the convulsing side. One should raise the question of something more than idiopathic epilepsy even without listening to the heart although once you do listen to it, you should definitely suspect it as the source of trouble.

The two-year background history of rather short duration phenomena raises the question

whether these might not have been seizure equivalents. Frequently, we see patients for convulsions who have in the past had short episodes of headaches or scotomata. They have an abnormal EEG. On anticonvulsant therapy, these little symptoms they have had for a year or two before the seizures disappear. This makes one wonder whether the episodes were not in reality subclinical seizures. Anti-convulsive medications controlled the seizures but the patient did not improve If this had been just a simple seizure phenomenon, once the seizures were controlled she should have immediately begun to feel better; however, she didn't. She had headaches, was lethargic, and her state of awareness decreased. Soon she began vomiting. We performed a lumbar puncture which was grossly bloody. She was in the age group for the rupture of an aneurysm. Yet with a heart like this, I think that the hemorrhage was related to her cardiac condition such as a mycotic aneurysm. Also this could have been a subarachnoid hemorrhage on the basis of the extremely wide pulse pressure. This was a little different clinical picture than what you see with the ordinary ruptured aneurysm. In ruptured congenital aneurysm — bang! they are hit, and then they start improving. They may have another acute insult from a second hemorrhage but the change in condition is rapid. This patient, however, had a constant downhill course without true stupor or coma. Often patients with headaches seen by anybody but a neurologist are diagnosed as migraine. However, migraine is a very definite entity, preceded by visual disturbances, then headache, nausea, vomiting, etc. I think we should back up a bit on this migraine problem. If we are going to explain occasional strange vascular phenomena as possible hemiplegic migraine, then we ought to be a little more reserved in the use of that term. At the University of Iowa there were two very serious reactions in hemiplegic migraine patients who had arteriography.

Dr. W. L. Jones*: I would like to make some comments regarding the Austin-Flint murmur. Differentiation between an Austin-Flint murmur and the diastolic murmur of mitral stenosis by auscultation alone is impossible. Clinically, one does not find pulmonary hypertension with the Austin-Flint murmur unless congestive heart failure coexists. I don't believe this lady had pulmonary hypertension. If she did, one would expect evidence of right ventricular strain with hypertrophy by ECG and I don't see it. Right ventricular strain is the ECG pattern commonly seen in mitral stenosis, which also is not present. By cardiac fluoroscopy or chest x-ray, we do not have a prominent pulmonary conus or the enlargement of the left atrium or right ventricle as one would expect to see in mitral stenosis. Therefore, I suggest this is probably not mitral-stenosis but principally an aortic insufficiency with or without some mitral insufficiency.

On the ECG there is no question of the presence of typical left ventricular hypertrophy. The limb leads give no additional help showing only the pattern of left ventricular hypertrophy, but the chest leads do raise some question of additional pathology. There are QS deflections in V1, 2, and 3, and a small R in V4. The T in V1 is upright. In V2 there is elevation of the ST segment with upward convexity, and a late T inversion. It seems to me there is an area of necrosis in the myocardium which I believe to be in the region of a small branch of the left coronary artery. You recall, that the left coronary artery divides into left circumflex and anterior descending branches. I interpret the involved area to represent one of the branches of the anterior descending branch. Inasmuch as this patient had central nervous system disease, obvious disease of the cardiac valves, and myocardial necrosis, my diagnosis would be subacute bacterial endocarditis with emboli to the cerebral and coronary arteries.

DR. CUTSHALL'S DIAGNOSES

1. Aortic valvulitis, rheumatic type, chronic, with aortic insufficiency
2. Probable mitral valvulitis, chronic, with mitral stenosis
3. Subacute bacterial endocarditis of mitral or aortic valve
4. Emboli to brain
5. Ruptured mycotic aneurysm of brain

PATHOLOGICAL DISCUSSION

Dr. J. F. Barlow*: The significant autopsy findings were limited to the brain and heart. The heart weighed 525 grams, a heavy heart for a girl weighing 105 pounds. There was fibrous obliteration of the pericardium but no constrictive pericarditis. The cardiomegaly was due to biventricular hypertrophy, the left ventricle measuring 2.3 cm. thick and the right ventricle 0.5 cm. respectively. The aortic valve

* Internist, Sioux Valley Hospital.

* Pathologist, Sioux Valley Hospital.

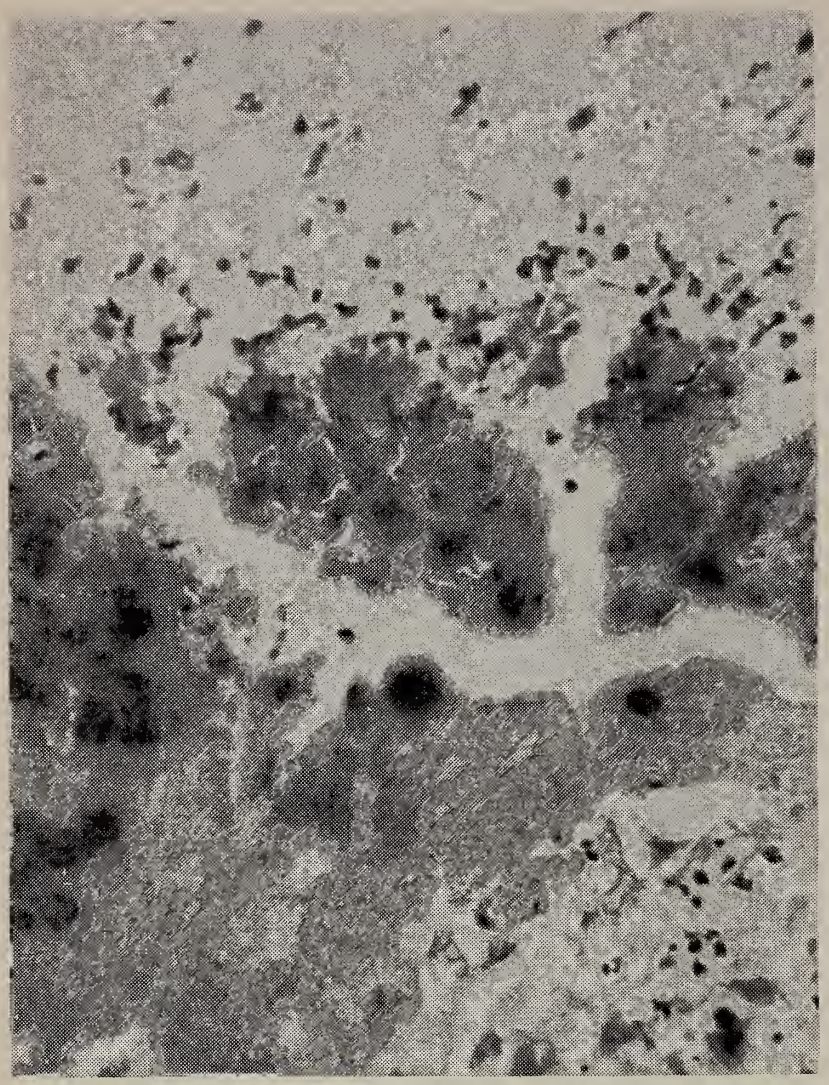


Fig. 5. High power of vegetation to show clumps of bacteria.

leaflets were thickened, contracted, and shortened. The commissures were not adherent. On the ventricular surface of the mitral cusp of the aortic valve was a friable red vegetation which extended onto the ventricular surface of the mitral valve. On the endocardium of the left ventricle just opposite the vegetation on the mitral valve was an ulcerated area with adherent vegetation. The mitral valve itself was thin, pliable, and unaffected by previous disease.

The brain weighed 1550 grams and had flattened gyri and sulci as well as marked softening of the left hemisphere. There was a massive hemorrhage on the left which extended into the ventricular system. A septic embolus was found in the left middle cerebral artery.

The spleen was enlarged at 550 grams.

Miscroscopically, there was ulceration of the endocardium, fibrin thrombus, polymorphonuclear leukocytes, and clumps of bacteria. Perhaps even more interesting were the sections of myocardium which showed septic emboli, microinfarcts, and areas of acute myocarditis. Microscopic sections near the area of hemorrhage into the left hemisphere showed a focus of acute inflammation and calcified debris similar to those seen in vegetative endocarditis. The organism cultured from the blood and valve in this case



Fig. 6. Destroyed branch of coronary artery in myocardium from septic embolus.

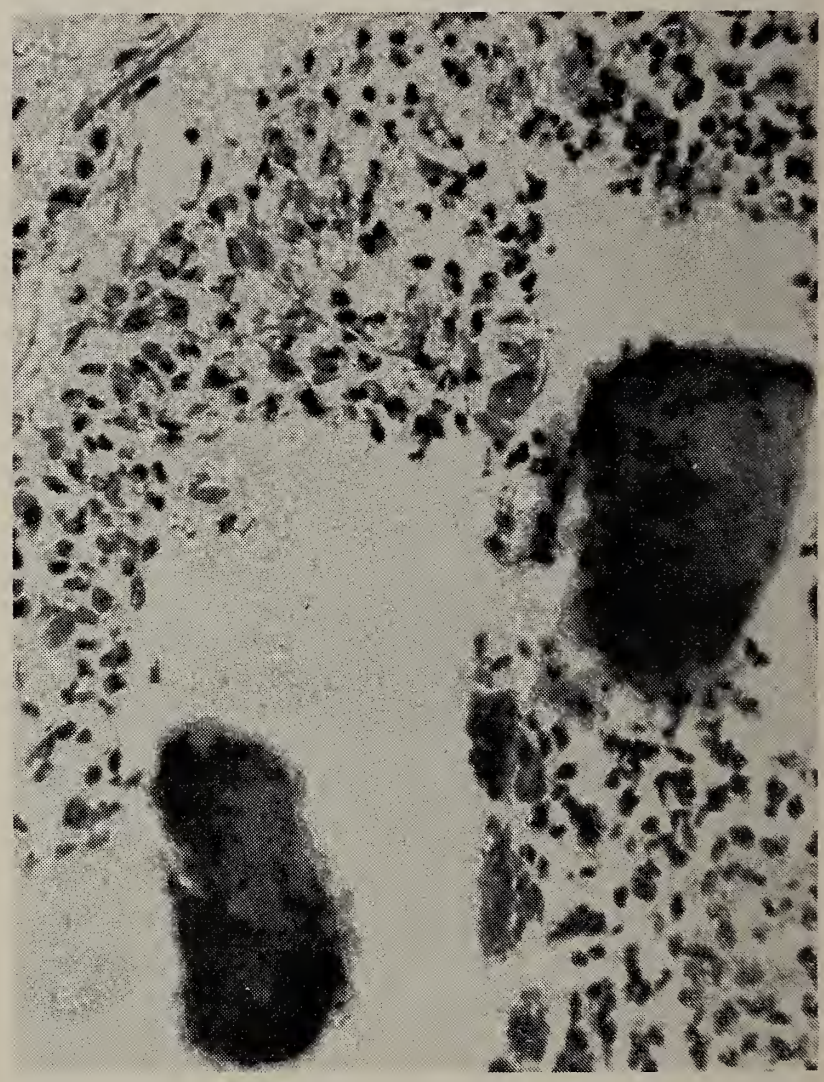


Fig. 7. Site of ruptured mycotic aneurysm in brain. Note clumps of calcified bacteria.

was an alpha streptococcus, very sensitive to penicillin.

The most likely series of events in this case begin with an alpha streptococcal endocarditis engrafted on aortic valvulitis of rheumatic origin. Septic emboli then were "thrown off" to the heart and brain. The infected emboli produced a mycotic aneurysm which caused the neurologic symptoms and eventual death from rupture with massive intracerebral hemorrhage. It is interesting to speculate on a few points which this case brings out. While most of us tend to think of bacterial endocarditis strictly as an endocardial disease with the well-known consequences of peripheral emboli with ulceration of the valve cusps and increasing valve deformity, the myocardium shows significant changes which can lead to congestive heart failure in some cases.

The following data are reprinted from work done by Otto Saphir:

HEART-35 CASES-MICROSCOPIC FINDINGS IN SUBACUTE BACTERIAL ENDOCARDITIS[1]

TYPE OF LESION	NUMBER OF CASES
Petechial hemorrhages	6
Acute myocarditis	15
Foci of necroses and abscesses	15
Minute infarcts	
Recent	2
Organized	28
Healed	13
Emboli	18
Perivascular, subacute and chronic inflammation	11
Aschoff bodies	14
Perivascular fibrous	15

There were questionable Aschoff bodies in this case. The incidence of Aschoff bodies in cases of histologically examined subacute bacterial endocarditis varies from 11 to 100%. This in itself raises the question of the part played by acute rheumatic carditis in bacterial endocarditis.

The last point is about the recent change regarding the classification and etiology of this disease. The organism and its antibiotic sensitivities are felt to be more important than the classification of the disease as to acute and subacute based on the duration of symptoms. This is certainly true from a practical point of view. In fact, tube dilution tests for antibiotic sensitivity have been recommended in following the patient. However, the basic question of why an organism as relatively nonvirulent as alpha streptococcus should cause endocarditis at all remains unsolved.

Dr. Smith: I would like to point out that although hemorrhage appears localized within the brain this was not an operable lesion. There was constant fresh intraventricular hemorrhage. The only thing that could have been done would have been to insert a catheter which I do not believe would have been of much help. This situation is quite different from what we see in a ruptured congenital aneurysm.

FINAL ANATOMIC DIAGNOSES

1. Aortic valvulitis, rheumatic type, chronic, with aortic insufficiency
2. Subacute bacterial endocarditis (streptococcus viridans) with involvement of aortic valve, mitral valve and left ventricular endocardium
3. Emboli to myocardium and brain
4. Myocardial infarcts, recent, embolic
5. Hemorrhage, intracerebral, massive, left, with intraventricular extension
6. Ruptured mycotic aneurysm left cerebrum

(1) This table was taken from page 743 in S. E. Gould's "Pathology of the Heart" in the chapter on Endocarditis written by Otto Saphir. Permission for reproduction was obtained from the authors and the Charles C. Thomas Publishing Company.

Photography by Wesley E. Halbritter, M.T. (ASCP), Sioux Valley Hospital.

ANNUAL OTOLARYNGOLOGIC ASSEMBLY

October 1 through 7, 1966

THE ANNUAL OTOLARYNGOLOGIC ASSEMBLY OF 1966 will be held October 1 through 7, 1966, in the new Illinois Eye and Ear Infirmary at the Medical Center, Chicago. The Department of Otolaryngology of the College of Medicine of the University of Illinois offers a condensed postgraduate basic and clinical program for practicing otolaryngologists under the direction of Doctor Emanuel M. Skolnik. It is designed to bring to specialists current information in medical and surgical otorhinolaryngology.

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TRIIODOTHYRONINE

(T_3) UPTAKE, A METHOD OF THYROID FUNCTION

INTRODUCTION

The I^{131} labeled triiodothyronine uptake has become the most frequently used test for thyroid function. Since no single test for evaluation of thyroid function is infallible, the use of two or more different tests is highly recommended. The PBI and the T_3 test make a reliable and practical combination. Both tests are **in vitro** methods that require only a single visit to the laboratory for a veni-puncture.

The T_3 test has several advantages, the most important of which is that previous medication with inorganic or organic iodine does not affect the validity of the results. (Very recently Christofori and Duncan have reported that the oral administration of a new cholecystographic iodine-containing compound sodium ipodate, produces false elevations in the T_3 uptake test.) Since no radioactive material is given to the patient the procedure may be repeated as frequently as the physician desires.

The T_3 test has shown excellent clinical correlation and is used as a follow-up for patients who are taking thyroid medications. Residual radioactive iodine in the patients blood from previous medication or diagnostic procedure does not influence the results, because all bloods received in the laboratory are routinely checked for radioactivity. Another advantage is that the T_3 procedure can be used in the pregnant patient and in children and infants since no radioactive material is ingested by the patient.

PRINCIPLE OF THE TEST

Hamolsky, (1955); Sterling, (1961); Steffee, (1963); Tauxe, (1963); Nelson, (1963); and others have discussed the principle of the test, and it is not important to go into the methods in detail.

Briefly, the T_3 test is based upon the affinity of certain serum proteins for thyroxine and triiodothyronine. Normal individuals and most patients with thyroid disorders have the same serum levels of thyroid-binding globulin (TBG). Triiodothyronine (T_3) labeled with I^{131} is added to these sera and incubated with either the patient's red blood cells, an ion exchange resin, or a polyurethane foam (sponge). (The red cells, resin, or sponge serves only as an indicator.) The amount of T_3 which can be bound to the TBG is determined by the amount of thyroxine (T_4) present in the blood, so that the uptake of T_3 is related to the patient's blood T_4. Accordingly, the uptake of T_3 is elevated in patients with hyperthyroidism and less than normal in myxedematous patients. The test can be performed on whole blood (collected in EDTA), plasma, or serum. The test clearly separates euthyroid, hyperthyroid, and hypothyroid persons.

PREGNANCY

In pregnancy the uptake of T_3 is low because of an increase in TBG, so that more of the T_3 is bound to the serum or plasma and less is available to be bound by the indicator. This test can provide assistance in predicting or following threatened abortion. A decrease in uptake has been observed to occur as early as 3-6 weeks after conception. It is essential to know the patient's normal uptake in the non-pregnant state. A decrease in the T_3 uptake is observed in a normal pregnancy. If no decrease in uptake occurs by 8-10 weeks, the patient may quite possibly abort. In the post-partum period the uptake returns to normal in about three weeks. Some experts in the field have suggested that the T_3 determination could probably be a reliable pregnancy test. Enovid* and Enovid-like drugs also cause a low T_3 uptake.

There are a number of methods used in performing the test. Therefore, each laboratory must establish its own normals. A summary of the most popular methods is given in Table I.

TABLE 1

SUMMARY OF THE TRIIODOTHYRONINE (T_3) UPTAKE METHODS

Indicator	RBC		Ion Exchange Resin	Polyurethane (Sponge)
Method	Hamolsky		Scholer**	Mitchell
Euthyroid	Males	11-19%	.86-1.20	26-35%
	Females	11-20%		
Hyperthyroid		19-39%	.86 or less	35-56%
Hypothyroid		4.5-12%	1.20 or higher	20-30%

*ENOVID®, G. D. Searle & Co.

**Normal pool arbitrarily set at a value of 1.00.

In Table II are listed some of the factors, including thyroid diseases, which affect T-3 values.

TABLE II
THYROID FUNCTION TESTS

Factors Increasing Results	Factors Decreasing Results
Androgen therapy	
Anticoagulants	
Aortic stenosis	CO_2 retention
Cortisone & ACTH therapy	Enovid therapy
Dilantin therapy	Estrogens
Hyperthyroidism	Hypothyroidism
Liver disease	Iodides
Large doses of salicylates	Pregnancy
Metastatic malignancy	Propylthiouracil
Nephrosis	Thiouracil
Oragrafin Sodium (sodium ipodate)	
Paroxysmal atrial arrhythmia	
Pulmonary insufficiency	

According to Hamolsky, the T-3 test is 98% accurate in hyperthyroidism and 93% accurate in hypothyroidism. In comparison, the PBI and I^{131} uptake are 85-95% accurate, the BMR only 50-70% accurate, and evaluations based upon cholesterol determination less than 50%.

SUMMARY

In summary, the T-3 test is simple, quick and extremely reliable. No radioactive material is ingested by the patient and the test is unaffected by iodides. T-3 uptake is useful in following therapy since it correlates very well with the clinical findings and failure to attain a normal uptake level is an indication of undertreatment just as an increase in uptake to a level above normal is a sign of overtreatment.

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No One Knows Like the Maker

When physicians encounter an adverse drug reaction it is not uncommon for them to write to the distributor of the drug, possibly in the form of a complaint or as a request for information on similar experience. Reports are often transmitted through the detail man. No one knows as much about marketing experience with a drug as its distributor. — Ralph G. Smith, M.D., in **Journal of New Drugs,** (6:66), January-February 1966.



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DEADWOOD DOCTOR

Chapter I

Deadwood Tenderfoot

FOREWORD: **Deadwood Doctor** was written by the late Frank S. Howe, M.D., for the entertainment, amusement, and contemplation of his colleagues. Therefore, the entire book will be published, a chapter each month, in the **SOUTH DAKOTA JOURNAL OF MEDICINE** — to be enjoyed by all physicians of South Dakota.

I remember my first case. It was July, 1901. I had been in Deadwood, South Dakota, about a week and hadn't had a single call. It was in the early evening and I was in my office when somebody came rushing up and told me there was a girl badly scalded by hot water at a restaurant across the street. I grabbed my bag and in the excitement of the emergency I didn't have time to look up anything in the book and I couldn't think of what should be used for burns, so I rushed downstairs to Julius Deetken, the old druggist, whose store was just below. I told him that I had a girl with a bad burn and asked him how I should treat it. He gave me a big bottle of carron oil. I rushed over and found the girl very badly scalded about the shoulders and arms, a second degree burn. I put on about the whole bottle of carron oil and covered it with a gauze dressing. She made an uneventful recovery with no scars.

I was 24 years old, the greenest tenderfoot who ever came west. I had just received my diploma from Illinois University Medical College. My room-mate, Dr. George R. Diven of Anderson, Indiana, who had been a telegraph operator at Ogden, Utah, before he studied medicine, was anxious for both of us to go to Utah to locate. We split our very meager funds, and he went out first to find a couple of towns not too far apart where we could locate and work together. After I had waited a week or more in Chicago for his report, he wrote me a very gloomy, pessimistic letter. We had a classmate in medical school who hailed from Deadwood, South Dakota, in the Black Hills. At that time I had never been west of Chicago and had never heard of the Black Hills. He gave me quite a build-up and wanted me to run up to the Black Hills and look around. He told me about the gold mines. He had a brother who was already located in Deadwood.

I got on the Burlington, and went as far as Hot Springs, where I had a classmate who was working for a doctor in Hot Springs as his assistant. I remained overnight with him and the next day came up to Deadwood.

I looked up my classmate's brother and found that his mother and sister were visiting in the east. He was unmarried. He invited me to come up and batch with him, which I did. After spending about a week meeting the doctors of Deadwood and Lead and looking around, I was invited by Dr. T. W. Moffit to come in with him, where I would have no overhead. I learned that since the office was over a drug store and the building owned by the druggist, rent was free in return for prescriptions that you could send to the drug store.

At that time, there were eleven doctors in Deadwood, all established, and I said to Dr. Moffit, "Why, I couldn't get a start here with all these doctors already established." His answer was, "If you can't stand competition, you might just as well find it out now as later." After thinking it over, I decided he was right and the next day I moved in with him.

I slept in the back of the office and as Dr. Moffit was married and had a family, he told me that he would turn over the night emergency work down what we called "The Line."

At that time there were some 27 variety theaters and saloons in Deadwood, and these included the famous "Green Front," the "Mansion," now the Fairmont Hotel, and the old "Combination Theatre." There wasn't a place in Deadwood that had a key or ever closed up. When the bartenders left, the porters came in to clean up and in case some thirsty individual came along, they would serve him drinks.

It was nothing unusual to be called out five or six times in one night for various emergencies. If there was ever a tenderfoot who came out West, I was it at that time. I didn't know there was such a thing as open gambling and the night life, but almost from the first, due to Dr. Moffit referring the work, I was doing almost all of the night emergency work down the line. Things were very different then from now. There were certain codes, and I was told immediately that it was perfectly all right to recognize and speak to bartenders, gamblers and sweethearts of the girls down the line, but under no circumstances must one ever recognize or speak to one of the inmates on the street. They never expected you to, no difference how often you had seen them professionally.

I took care of cases of every poison known to man at that time, including potassium cyanide,

carbolic acid, strychnine, bichloride of mercury, iodine, morphine, lysol and chloroform. It seemed to be a regular occurrence with these girls that every time they had a fight with their sweetheart they ended up by taking poison. We never dreamed of going out without a stomach tube, which was very frequently used. I remember well, a girl that took a very large dose of morphine. At that time we had no oxygen, no artificial lungs, or pulmotors, I organized a team to give artificial respiration. This was kept up without a single halt for 72 hours. At that time she succumbed.

We had many gunshot wounds, stabbings — in fact, every possible kind of emergency. It was a great experience for a young doctor. Dr. Moffit had several mining contracts, and it fell to my lot to make many of these trips. When I had been here but a short time, I had a call to go to one of the nearby mining camps. I hired a saddle horse from the livery barn. The stable man had the horse all saddled and ready and I tried to get on him. He danced around and wouldn't let me on. I couldn't imagine why not because I had ridden a lot back on the farm. The stable hand said very quietly, "I think you can get on him if you will try it from the left side." This I did and the horse stood like a statue. Our horses back east were work horses; you could get on them any old way.

One of the comparatively early cases I had was a shooting just across the street from my office. I was sitting in the office reading about 7 o'clock in the evening when I heard a shot. In those days in an emergency, the fellow who got there first and fastest, got the case. When I heard the shot, I grabbed my bag and ran and as I had the advantage of being so close and being the youngest doctor, I won the footrace. A short time afterwards the late Dr. Torrence came.

We found that a pawn shop owner had been shot following an argument with an employee. He was shot through the left chest but the bullet missed the heart. The police locked the doors. We had a large audience looking through the plate glass windows. I overheard a conversation on the outside while we were doing first aid in which one man said, "Who is that young fellow there? I don't know him." The other fellow answered, "That's Dr. Howe. He sure knows his stuff, too." I got about 6 inches taller.

The pawn shop operator fully recovered. One of the amazing incidents was that his son was walking up and down, wringing his hands, saying, "Pa, Pa, give us the combination to the safe before you die." But Pa didn't die but lived many years afterwards.

They later tried the fellow who had shot the pawn shop operator, and he was sent to the pen. During the trial, the victim was asked to identify the man who had shot him. He looked at him and said, "Yes, yes, that's the man who murdered me."

To many people Deadwood was thought to be a town where it was necessary to go around with a gun belt and a six shooter. This was absolutely not the case. A man who attended to his own business could go any place in Deadwood at any hour, day or night, in perfect safety. There were only three times in all my residence in Deadwood when I really felt that I was in danger, and they were years later. At one time I was making a professional trip some 7 or 8 miles out toward Spearfish and at the site of Pinecrest Park about two miles out, I saw a man in overalls walking out in the same direction in which I was going. He had no luggage of any kind and I assumed him to be a hired man or rancher from the valley. I stopped my car, a coupe, and asked him if he would care to ride. He at once accepted and when I saw what I had picked up I thought "what a foolish move!" He was one of the toughest looking hombres I have ever met. I talked fast and visited with him constantly. I asked him where he was going. He told me that he was going to Rapid City. I informed him that he was going in the wrong direction but at the fork of the road to Whitewood he would have no trouble picking up a ride. Three times during the short trip out to where he was to leave me he hesitated and through a sixth sense or something I had the feeling that he was just ready to hold me up and take the car away from me. I, of course, talked faster than ever.

The last time he reached for his side pocket, I have no doubt whatever that he started to reach for a gun. I had nothing whatever with which to defend myself and had made up my mind to turn the car over to him and tell him to use the car and go wherever he wished. If he cared to leave it somewhere, I would have it picked up. However, I finally got him to the corner and let him out. I was certainly not long in getting out of there.

There was another case in which a man had lost his only son in a motorcycle accident. He ran into a car which had backed out of an alley. The boy was going downhill at a terrific rate of

(Continued on Page 36)

Flagyl destroys trichomonads



here & here & here & here

No topical treatment can

Flagyl eliminates the difficulties and frustrations that have long attended the treatment of trichomonal infection.

These difficulties arose mainly from:

1) the failure of any previously known agent to destroy the protozoan in paravaginal crypts and glands;

2) the failure of any previously known agent to prevent reinfection by eradicating the disease in male consorts.

The introduction of Flagyl removed both of these long-standing deficiencies. Hundreds of published investigations in thousands of patients have confirmed the ability of Flagyl to cure trichomoniasis.

Correctly used, with due attention to repeat courses of treatment for resistant, deep-seated invasion and to the presumption of reinfection from male consorts, Flagyl has repeatedly produced a cure rate of up to 100 per cent in large series of patients.

Nothing cures trichomoniasis like Flagyl.

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metronidazole

Dosage and Administration

In *women:* one 250-mg. oral tablet t.i.d. for ten days. A vaginal insert of 500 mg. is available for local therapy when desired. When the inserts are used one vaginal insert should be placed high in the vaginal vault each day for ten days, and concurrently two oral tablets should be taken daily.

In *men:* in whom trichomonads have been demonstrated, one 250-mg. oral tablet b.i.d. for ten days.

Contraindications

Pregnancy; disease of the central nervous system; evidence or history of blood dyscrasia.

Precautions and Side Effects

Complete blood cell counts should be made before and after therapy, especially if a second course is necessary.

Infrequent and minor side effects include: nausea, unpleasant taste, furry tongue, headache, darkened urine, diarrhea, dizziness, dryness of mouth or vagina, skin rash, dysuria, depression, insomnia, edema. Elimination of trichomonads may aggravate moniliasis.

Dosage Forms

Oral—250-mg. tablets/Vaginal—500-mg. inserts

SEARLE

Research in the Service of Medicine

(Continued from Page 33)

speed. When he hit the car, he was thrown clear over the car. He was terribly injured and lived only a few days. After an interval of possibly a month, I sent the boy's father a statement. He came barging into the office. He had apparently been drinking and was still half crazed from grief. He started to yell that I had killed his boy and what he was going to do. He reached for his hip pocket. I am very positive that he meant to kill me and then commit suicide.

I saw only one out, and I said, "I'm not the fellow who killed your boy. You killed him when you bought him the motorcycle. You are the murderer." This put him on the defensive and the danger was over. Before he left we agreed upon the bill he was to pay and he sent me a check.

I was called to Rapid City to see a 12 year old boy that was being treated for rheumatism. It was very apparent to me that he had an osteomyelitis. The boy had gone in swimming in a cold pool and stayed out all night during the early spring. I had his father bring him up on the train and x-ray showed bone infection near the left shoulder. I immediately operated on this and curetted the dead bone and packed it. Next it appeared below the knee, then above the knee. By that time the hospital had gotten rather tired of keeping the boy without any money or any prospects of any. His father moved him down town to a rooming house where things were very far from sanitary. I made daily visits and finally he developed another localized bone infection for which I advised immediate operation. The father then called an osteopath and the next I heard of it the father came to my office and asked me what I was going to do about it. It was very evident that his idea was blackmail. I told him to get out and stay out or I would throw him downstairs. He went out the door threatening that he was going to get me.

At this time, W. E. Adams was Mayor of Deadwood. I told Mr. Adams that this man was known as a horse thief in the Rapid City area and that I had evidence that he had stolen flour since coming to Deadwood. He told me that he would have his Chief of Police investigate. The Chief found that he was an upright citizen and very desirable. Mayor Adams told me that the man was a good citizen and would remain in Deadwood. I decided to carry a gun just in case, but I had no use for it. The man soon left Deadwood.

Like every other young doctor who came to this section of the Black Hills, I immediately made a trip to Lead and contacted Dr. D. K. Dickinson who was Chief Surgeon of the Homestake Mining Company. At that time I also met Dr. J. W. Freeman who was Associate Chief Surgeon for the Homestake. I, of course, applied for a position with the Homestake and was told by Dr. Dickinson that at that time they had no vacancies but that he would keep me in mind and as soon as there was a vacancy he would consider my application. In the meantime I had located in Deadwood and in September, about two or three months after my locating in Deadwood, Dr. Dickinson called on me and told me that there was now a vacancy.

However, I had decided to remain in Deadwood and told Dr. Dickinson so. He asked me if I knew of anyone else who might be looking for the position. I told him that my former roommate, Dr. George R. Diven who was located in a small town in Utah, was anxious to come to the Hills. Dr. Dickinson asked me if I had his picture and as soon as he had taken a look at the picture said, "How soon can you get him?" He had told me he could come immediately in case of a vacancy. Dr. Dickinson asked me to wire him, which I did and in about three days he arrived on the Burlington train from the west. The Burlington train arrived in Deadwood in the early evening at that time.

After we had dinner, I took my friend out to see the town. As I remember, we got back to my room about 12 or 1 o'clock and things were just beginning to come alive in the lower part of town at that time. Dr. Diven said, "When do these people in Deadwood sleep?" I told him that people in that part of town slept in the day time. The next day I took Dr. Diven to Lead and introduced him to both Dr. Dickinson and Dr. Freeman and he immediately started to work. The starting salary then was $75.00 per month plus room and board. Nevertheless, all the young doctors were anxious to go to work for the Homestake. Dr. Freeman later became my closest friend and advisor in the medical profession. Always when I was not sure as to just what I should do, I could and did advise with Dr. Freeman. His advice was always sound. Up until the time of his death, we were fast friends, making trips east together to the clinics almost every year.

(To Be Continued Next Month)

Letters to the Editor

SCHOOL OF MEDICINE

April 5, 1966

Paul H. Hohm, M.D.
President
S. D. State Medical Association
Huron Clinic
Huron, South Dakota

Dear Doctor Hohm:

I wish to take this opportunity to thank you on behalf of the medical school for the very generous donation of $4,851.05 to our school which you presented to me at our annual awards banquet on April 1. This permits me to identify the importance of these contributions to our operation. Funds accumulated from AMA-ERF over the past three years were distributed as a direct salary allocation to our basic faculty this past year. We, of course, regret that the amount of these contributions is not going to permit this kind of allocation each year but rather we will have to look forward to an accumulation of funds until such time as a substantial allocation can be made. In any event, it illustrates the importance to our school of these unrestricted funds. I could show you salary schedules prepared each year by our Association of American Medical Colleges indicating the very low status that our school has in relation to other medical schools and which would properly illustrate the importance that these funds have.

Time has not permitted at this writing an opportunity to go over the record for the last five years or so but I have the impression that these contributions are becoming reduced each year. I hope this doesn't mean what it suggests and that is the feeling that the medical schools, or at least this one, are being adequately supported from either state and/or federal agencies. Speaking directly for this school, there is no time in history when we are in greater need of undesignated or unrestricted funds.

Sincerely yours,
Walter L. Hard, Ph.D.
Dean

532 Elm Street, Apartment 5
Vermillion, South Dakota
April 6, 1966

Mr. Richard Erickson, Secretary
South Dakota State Medical Association
711 North Lake Avenue
Sioux Falls, South Dakota

Dear Mr. Erickson:

I would like to thank you and the South Dakota State Medical Association for the scholarship which I received Friday night at the medical school banquet.

As you are probably aware, there never seems to be enough money to quite go around, and this scholarship will help very much.

Once again thank you very much and I will do my best to justify this confidence which you have placed in me.

Yours truly,
Dorn Van Cleave

Medical School
USD
April 4, 1966

The South Dakota Journal of Medicine
711 N. Lake Ave.
Sioux Falls, South Dakota

Dear Sirs:

The enclosed list of awards was made on April 1, 1966. Dean Hard spoke and made the presentations.

We know that many Association members are contributors to these awards or are otherwise interested in their disbursement. We would like to express our gratitude to the Association for its part in the scholarships.

Sincerely yours,
Kenyon Kramer
SAMA Representative
USD Chapter

STUDENT AMERICAN MEDICAL ASSOCIATION

Vermillion, S. Dak.

Richard C. Erickson April 6, 1966
Executive Secretary
South Dakota State Medical Association
711 North Lake Avenue
Sioux Falls, South Dakota 57104

Dear Mr. Erickson,

Thank you for your letter of April 6, 1966, and the check in the amount of $200.00 to assist us in the travel expenses to the SAMA National Convention in May. The convention this year will be in Los Angeles, California, and the proposed location for 1967 is Philadelphia, Pennsylvania. The kind contribution of the South Dakota State Medical Association will help ensure adequate representation of South Dakota in the proceedings.

This year our delegates will be assigned to two reference committees to review resolutions prior to action on the floor of the House of Delegates. A resume of our activities will be forwarded to your office for inclusion in the South Dakota Journal of Medicine.

Sincerely yours,
D. L. Johnson
Chapter President

ROCKY MOUNTAIN CANCER CONFERENCE SCHEDULED

Denver, Colorado, is once again the site of the 20th Annual Rocky Mountain Cancer Conference, July 15-16, at the Brown Palace Hotel. The two-day conference will feature some of the nation's most distinguished speakers on the subject of cancer.

Morning symposia for the two-day Conference will deal with "Malignancies and Allied Diseases of the Chest" and "Diagnostic Methods and the Frequency of Their Utilization for all forms of Cancer in the General Practice of Medicine and Surgery." The afternoon session of the first day will be devoted to scientific papers by guest speakers with the second afternoon devoted to an "Information Please" session.

An added attraction this year will be two special scientific exhibits that are closely related to the program; one on "Uranium Cancer of the Lung" with the other exhibit sponsored by the American Cancer Society.

Further information may be obtained by writing ROCKY MOUNTAIN CANCER CONFERENCE, 1809 East 18th Avenue, Denver, Colorado 80218.

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1) Cabinet style office sterilizer with water boiling attachment.
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4) Perimeter.
5) Some miscellaneous office instruments.

No reasonable offer refused. Contact John B. Gregg, M.D., 318-D West 18th Street, Sioux Falls, South Dakota.

MEMO FROM THE EDITOR:

Elsewhere in this issue is a 4-page insert on behalf of Dorsey Laboratories. This is a new venture for Dorsey, and its success is dependent upon the response which the ad produces. We, therefore, invite our readers to write Dr. Raymond C. Pogge of Dorsey Laboratories, Lincoln, Nebraska, giving him their reactions to this insert and method of relaying medical service information.



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A 'TIRED AMERICAN' GETS ANGRY

By

Alan C. McIntosh, Publisher, Star-Herald, Luverne, Minnesota

"I am a tired American.

"I'm tired of being called the 'Ugly American'.

"I'm tired of having the world panhandlers use my country as a whipping boy 365 days a year.

"I am a tired American — weary of having American embassies and information centers stoned, burned and sacked by mobs operating under orders from dictators who preach peace and breed conflict.

"I am a tired American, wearied of being lectured by Gen. De Gaulle (who never won a battle) who poses as a second Jehovah in righteousness and wisdom.

"I am a tired American, weary of Nasser and all the other blood-sucking leeches who bleed Uncle Sam white and who kick him on the shins and yank his beard if the flow falters.

"I am a tired American . . . choked up to here on this business of trying to intimidate our government by placard, picket line and sit-in by the hordes of the dirty, unwashed who rush to man the barricades against the forces of law, order and decency.

"I am a tired American, weary of the beatniks who say they should have the right to determine what laws of the land they are willing to obey.

"I am a tired American — fed up with the mobs of scabby-faced, long-haired youths and short-haired girls who claim they represent the 'new wave' of America, and who sneer at the old-fashioned virtues of honesty, integrity and morality on which America grew to greatness.

"I am a tired American, weary unto death of having my tax dollars go to dictators who play both sides against the middle with threats of what will happen if we cut off the golden stream of dollars.

"I am a tired American . . . nauseated by the lazy do nothings who wouldn't take a job if you drove them to and from work in a Rolls Royce.

"I am a tired American who is getting madder by the minute at the filth peddlers who have launched America in an obscenity race . . . who try to foist on us the belief that filth is an integral part of culture . . . in the arts, the movies, 'literature,' the stage (and the mobs who see Lenny Bruce as 'brightly amusing' and Norman Mailer as 'compelling.') I'm tired of these 'artists' who scavenge in the cesspools for inspiration and who refuse to look up at the stars.

"I am a tired American—weary of the bearded bums who tramp the picket lines and the sit-ins — who prefer Chinese communism to capitalism — who see no evil in Castro, but sneer at President Johnson as a threat to peace.

"I am a tired American — who has lost all patience with that civil rights group which is showing propaganda movies on college campuses from coast to coast. Movies denouncing the United States. Movies made in Communist China.

"I am a tired American, who is angered by the selfrighteous breast-beater critics of America, at home and abroad, who set impossible yardsticks for the United States but never apply the same standards to the French, the British, the Russians, the Chinese.

"I am a tired American who resents the pimply-faced beatniks who try to represent Americans as the 'bad guys on the black horses'.

"I am a tired American who is weary of some Negro leaders, who, for shock purposes, scream four letter words in church meetings.

"I am a tired American sickened by the slack-jawed bigots who wrap themselves in bed sheets in the dead of night and roam the countryside looking for innocent victims.

"I am a tired American who dislikes clergymen who have made a career out of integration

(Continued on Page 42)

PRESIDENT'S PAGE



Dear Members:

It is with mixed emotions that I begin my final President's Message to our Doctors and Friends. The year has been filled with changes in medical care, the depth of which will take many years to completely evaluate. The medicine of the last decade administered by the Doctors is gradually being invaded by the Federal Bureaucracies. The direct patient-doctor relationship is being interferred with as third party medicine is being thrust upon the citizens of our nation.

Your Council, Officers and Executive Office have spent many hours in an attempt to impede the onslaught of third party intervention in the practice of medicine in our state. The problems faced by these bodies were varied and numerous. I want to assure you that the guidelines born at these meetings, which formulated the South Dakota State Medical Association stand on these various problems, were thoroughly discussed and debated before a final decision was reached. Your Council seemed especially prudent in their actions, as their decisions will surely bear out in the future of our State organization. These men have given many hours of their time so that our Association in this State can handle wisely the new problems created by Medicare. Let us, therefore, give credit to them for an effort honestly carried through this last year.

I have enjoyed the exceptional cooperation given by all to me as your State President. May the problems confronting us in the years to come be less difficult than they were in the year now ending.

Sincerely,

Paul Hohm, M.D., President S.D.S.M.A.

This is your
MEDICAL ASSOCIATION

News Notes • Changes • Births • News

Pop's Proverb

Don't complain about your lot. What if you got what you deserved?

NEWS NOTES

C. M. Kershner, M.D., Brookings, attended a course in aviation medicine at the University of California San Francisco Medical Center. The course was sponsored by the Federal Aviation Agency.

* * *

Paul Reagan, M.D., Sioux Falls, has announced that he will be a candidate for a third five-year term on the Sioux Falls Board of Education. He currently is chairman of the finance committee.

* * *

G. Robert Bartron, M.D., has announced that he will seek nomination as a candidate for a second two-year term in the State Senate. First elected in 1964, Senator Bartron represents the 18th district of Codington County.

During the 1966 session, he authored the bill to create a state mental health commission and sponsored amendments to overhaul South Dakota's water pollution control laws, defining Class A waters and speeding up the procedure to combat pollution.

F. J. Gilbert, M.D., former Belle Fourche general practitioner, has joined the professional staff at the Fort Meade Veterans Hospital. Dr. Gilbert had been in practice in Belle Fourche for some 20 years.

* * *

Alonzo P. Peeke, M.D., Volga, has been reappointed a member of the Committee on Medicine and Religion of the American Medical Association. The reappointment was announced by Dr. Percy E. Hopkins, chairman of the AMA's Board of Trustees.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

Walter Kitzler, M.D., has announced plans to open his practice in Ipswich, South Dakota.

* * *

A former student of the University of South Dakota, **Dr. Roger Herbrandson,** has begun practice in Vermillion, South Dakota. Dr. Herbrandson had practiced in Lead, South Dakota, previously.

* * *

New officers elected by the Sixth District Medical Society are as follows:

President—
W. H. Fritz, M.D.,
Mitchell
Vice-president—
F. D. Gllis, Jr., M.D.,
Mitchell
Secretary-treasurer—
J. T. Berry, M.D.,
Mitchell

* * *

A contribution of $4,851.05 has been presented to the University of South Dakota Medical School by the South Dakota State Medical Association.

The money represented a grant from the American Medical Association Education and Research Foundation (AMA-ERF).

The National Science Foundation has announced that **Dr. Raymond J. Lynn,** Associate Professor of Microbiology with the University of South Dakota Medical School, has been awarded a research grant totaling $43,200 for the next two years.

This is the second two-year grant Dr. Lynn has received in his research on the "Immunochemical Analysis of Mycoplasmataceae" concerned with analysis of antigens of certain organisms associated with disease in man and animal, and the host response to these organisms.

* * *

E. A. Johnson, M.D., Milbank, was one of five South Dakotans recognized recently for service to education at the conference for school administrators and board members at South Dakota State University. Elected to the Milbank school board in 1954, he has served as president the past 10 years.

Howard Saylor, M.D., Huron, attended the Cleveland Sectional Meeting of the American College of Surgeons in March.

* * *

Arthur A. Lampert, M.D., Rapid City, has been reappointed a member of the Council on Legislative Activities of the American Medical Association. The reappointment was announced by Dr. Percy E. Hopkins, chairman of the AMA's Board of Trustees.

S. A. DONAHOE, M.D.

1887—1966

We wish to express our sincere sympathy to the family of S. A. Donahoe, M.D., who passed away May 2, 1966.

Dr. Donahoe was one of the original founders of the Donahoe Clinic in Sioux Falls, and had continued to practice medicine until the time of his death.

He is survived by his widow, and two sons, Dr. Robert Donahoe of Sioux Falls, and Dr. Jack Donahoe of Sioux Falls.

(Continued from Page 39)

causes, yet send their own children to private schools.

"I am a tired American who resents those who try to peddle the belief in schools and colleges that capitalism is a dirty word and that free enterprise and private initiative are only synonyms for greed.

"They say they hate capitalism, but they are always right in the head of the line demanding their share of the American way of life.

"I am a tired American who gets more than a little bit weary of the claque in our State Department who choose to regard a policy of timidity as prudent . . . the same group who subscribe to a 'no win' policy in Viet Nam.

"I am a tired American — real tired of those who are trying to sell me the belief that America is not the greatest nation in all the world — a generous-hearted nation — a nation dedicated to the policy of trying to help the 'have nots' achieve some of the good things that our system of free enterprise brought about.

"I am an American who gets a lump in his throat when he hears the 'Star Spangled Banner' and who holds back tears when he hears those chilling high notes of the brassy trumpets when Old Glory reaches the top of the flag pole.

"I am a tired American . . . who wants to start snapping at those phony 'high priests' who want us to bow down and worship their false idols and who seek to destroy the belief that America is the land of the free and the home of the brave.

"I am a tired American who thanks a merciful Lord that he was so lucky to be born an American citizen . . . a nation . . . under God . . . with truly mercy and justice . . . for all."

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PUBLISHED MONTHLY BY THE S. DAK. STATE MEDICAL ASSN.

JOURNAL OF MEDICINE

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THE SOUTH DAKOTA

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**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **June, 1966** **Number 6**

CONTENTS

Megacolon 17
Warren L. Jones, M.D.; Guy E. Tam, M.D.;
Dorence L. Ensberg, M.D.; Roy C. Knowles, M.D.

Deficiency of the Anterior Lobe of the Pituitary in Adult Males . . 22
Gordon S. Paulson, M.D., F.A.C.P.

Delivery and the Defective Child — The Role of Obstetrics 27
C. A. Stern, M.D.

Deadwood Doctor 33
Frank S. Howe, M.D.

Editorial 37

This Is Your Medical Association 39

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MEGACOLON

A Case Report With Discussion and Therapy*

Warren L. Jones, M.D.‡; Guy E. Tam, M.D.†;
Dorence L. Ensberg, M.D. and**
Roy C. Knowles, M.D.**
Sioux Falls, South Dakota

Since the practicing physician is not often confronted with the definitive diagnosis in a patient with megacolon, the authors would like to share their experiences in dealing with such a problem.

The finding of megacolon may be a surprising x-ray finding for the attending physician who may unwittingly fail to seek out the etiology, and thus overlook curative therapy. Since congenital megacolon (Hirschprung's disease) can be treated surgically and cured, and behavioral or "functional" constipation may be cured by expert psychotherapy, and since continued symtomatic treatment only serves to perpetuate the problem, it is indeed important to arrive at the proper diagnosis and prescribe therapy accordingly. Therefore, the following case report and discussion.

Case Report: (SVH ♯399529) This 14-year-old boy's chief complaints involved irregularity of stool habits with intermittent obstipation, fecal impaction, and incontinence, since infancy. His mother thought the problem began at the onset of toilet training. She stated, "At that time I would punish him if he soiled his clothing, then he began holding it until it hurt when he did have a movement. It got so he was afraid to go to the toilet, and at times he would hide from us."

The fecal incontinence occurred principally during the day, and only three nocturnal accidents occurred during the past year. A week would often lapse between complete (adequate) bowel movements, then there would be no "accidents" for three or four days. The parents usually had to tell him to go to the bathroom on these occasions. They felt that he could control his movements. This parental misconception was re-enforced by repeated experiences exemplified by the following: having explained to the boy, "You can do this if you go to the bathroom first," he would usually promptly succeed in having a good bowel movement.

At seven years of age he was hospitalized and barium x-ray studies were performed (see Figures 1 and 2). These, and other routine studies, were negative. At that time a new program was begun. This consisted of his "trying" to have a bowel movement each day and offering a gold star reward on a wall chart for each success. This method failed after two weeks and was abandoned. Another approach was to make the patient wash out his own dirty underwear, and this did not seem to alter the situation. Furthermore, it didn't seem to bother the patient to be around other people after soiling his clothing, and it was usually his parents who became embarrassed and would tell him to go "clean yourself up." Other methods of reward and punishment were attempted, but none produced any lasting control.

Now, at fourteen years of age, the patient agreed that he had had a problem which was out of control. He stated he frequently got the urge to defecate, and then after two or three minutes he would be unable to hold it any longer. If he was not close to a bathroom he would soil his clothing. Because of this his activities were somewhat limited, but he had hopes of getting this problem solved before he started high school this fall, and was fearful of the embarrassment he might otherwise encounter.

Further review of the gastrointestinal system was negative. There was no history of melena, indigestion, anorexia, nausea or vomiting, diarrhea or food intolerance. The parents believed that he was constipated most of the time. He had three younger brothers, all healthy and with no stool problems. The system review and past history were not of further help.

A complete physical examination was performed. Those data omitted were entirely negative. This was a well-nourished, well-developed, healthy appearing male adolescent, in no discomfort or distress. His growth and development seemed entirely normal. He was alert, cooperative, and of normal intelligence. The abdomen was mildly rounded, and with slight fullness in the left mid-and-lower quadrants. In this location an area of increased resistance was palpable, approximately the size of a child's football. It could not be outlined, was smooth and non-tender. There was no abdominal tenderness, and no other organs or masses were palpable. On rectal examination good sphincter tone was found present. The rectal ampulla was larger than normal, and contained considerable quantity of soft stool. The boy's underclothes were soiled with two-three tablespoonsful of normal-appearing stool at the time of admission examination.

The CBC, urinalysis and erythrocyte sedimentation rate were entirely normal. A barium enema study (see Figures 3 and 4) revealed: "August 19, '65 BARIUM ENEMA: The rectum and lower sigmoid are more markedly dilated and contain large amounts of fecal residue. The appearance of the bowel in this segment is quite typical of a megacolon. Because of the difficulty these patients have evacuating the barium, no attempt was made to fill beyond the lower descending colon. There is much less dilatation in this area but a large amount of fecal residue is also present here."

These were the characteristics and the setting of a rather vexing problem facing the physician. The parents were rather demanding that a diagnosis be made and the problem handled; and the patient would rather have been at the county fair, and seemed a little anxious whatever the

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* Presented on 21 August 1965 as an Intern's Medical Conference at Sioux Valley Hospital, Sioux Falls, South Dakota.
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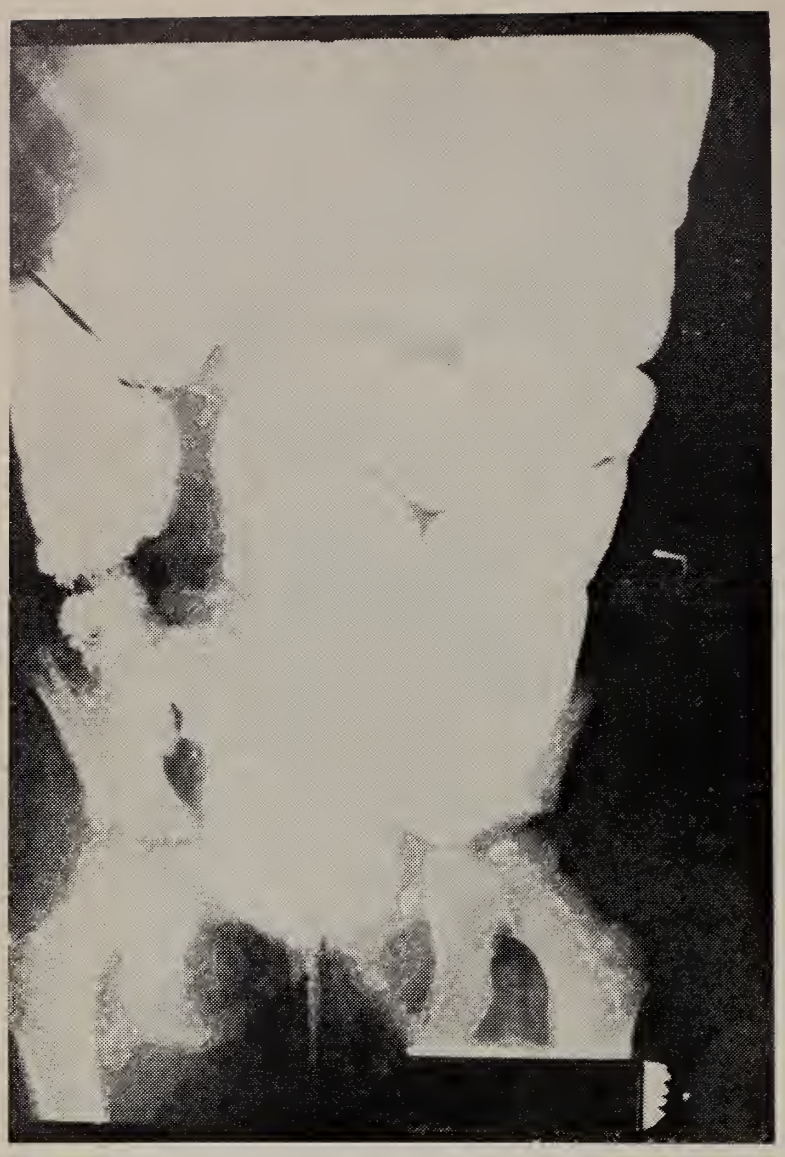


Figure 1. Barium filled colon, performed in 1958 and reported negative.



Figure 2. Post-evacuation film of the barium enema study performed in 1958.

final diagnosis might be. This appeared to be an organic illness with considerable functional and emotional components. Since it seemed evident that this might be a surgical problem, a surgical consultation was requested. Our consultant attended the medical conference and presented the following exercise in differential diagnosis.

DR. DORENCE L. ENSBERG (general surgeon): This patient was seen in surgical consultation because of the suspicion of a Hirschprung's congenital megacolon and that some relief might finally be obtained by an operative procedure.

This boy offered two outstanding, apparently paradoxical symptoms, i.e. constipation and incontinence, soilage or poor control. Of utmost importance is the time of onset of symptoms. Although it has been described as "since infancy," it was my distinct impression that until toilet training began at an early age there was no particular concern about bowel action, certainly no clear-cut history of constipation in early life.

In further support of the absence of organically based constipation in early life is the normal barium colon study at age seven. (See Figure 1).

The importance of this determination lies in the consistent onset of symptoms, in Hirschprung's disease, at birth or early infancy to a degree sufficient to almost exclude the disease if symptoms are not noted before the second year of life.[1] Less commonly symptoms are so mild that they escape attention until later in life. Among the outstanding signs are enlargement of the abdomen and nutritional defects, although not always present, are frequent enough to make their absence in this case significant.

The next important point in considering this patient concerns the rectal examination and current barium study. In Hirschprung's disease the rectum is almost uniformly empty, a point considered indicative of the sigmoid or rectosigmoid level of obstruction in the great majority of cases. Only in a small percentage of cases will any stool be found regularly in the rectum.[2-3] By x-ray this is demonstrated graphically in the typical normal or narrowed rectal segment below the voluminous colon.

The rectal examination in this patient revealed first a large soft fecal mass completely filling the rectum resting on the anal sphincter with no empty or near empty segment whatsoever. Secondly, it revealed a normal to in-



Figure #3. Barium enema study in August 1965 showing markedly dilated sigmoid colon and rectum containing large amounts of fecal residue.



Figure #4. Dilated sigmoid colon and rectum (August 1965), after partial evacuation. Note the point of obstruction is at the anal opening.

creased sphincter tone over which voluntary efforts resulted in further powerful contraction or relaxation at the suggestion of the examiner. It should also be noted here, that by history this patient felt the urge to stool, he was aware of the impending soilage; in other words, sensory defect did not appear to be present. The x-ray study on February 2, 1965 (see Figure 3) verified the absence of the empty segment.

In evaluating this patient we should recall that: (a) the changes referred to as "megacolon" are nonspecific and represent the response to chronic partial obstruction from whatever cause and are not peculiar to any specific type; (b) that proper control of stool requires intact sensory mechanism of both rectum and anus, plus satisfactory anatomical and motor activity of the anal sphincter mechanism; this motor activity being partially reflex and involuntary yet capable of allowing an overriding voluntary control; (c) that the bowel portion of the expulsive force is involuntary and assisted by voluntary alterations in intra-abdominal pressure.

Therefore, in this patient our observations, thus far, show us that (a) no chronically obstructed point above the anal sphincter is present to produce the megacolon, and by history the sphincter is capable of passing a two to three inch caliber formed stool, hardly the issue of a stenotic orifice, and (b) by history and physical findings we are led to believe that normal sensory and motor mechanisms are present without gross anatomical defects.

What then is the obstruction, and why the soilage? In my opinion, an anatomically and physiologically normal anal sphincter is here being used in an abnormal fashion consciously or subconsciously to alter the usual bowel pattern. The incontinence probably represents the effect of the hypertrophied powerful involuntary expulsive action of the bowel forcing the contained stool downward in piston-like fashion, forcing variable amounts of bowel contents through the anal opening.

In summary, then, this boy in my opinion does not have Hirschprung's disease because:

1. Clear history of onset in infancy is lacking and probably began much later than second year of life since x-rays at the age of seven or eight were normal.
2. Dilatation and fecal mass extends to the anus, and the characteristic segment of nor-

mal or narrow caliber with empty lower rectum is not seen.

3. There is no hint of abdominal distention or effects on growth or development.

4. There is a history of undue parental concern and struggle over toilet training that I feel is sufficiently prominent in this case to lead one to suspect an emotional cause not only by exclusion but as a primary diagnosis.

In my opinion, rectal biopsy for verification of the presence of normal Auerbach's plexus is not necessary in this case. Psychiatric evaluation is recommended.

DR. ROY C. KNOWLES (PSYCHIATRIST): When the psychiatrist was asked to see this child the internist and surgeon had already seen him and exhaustively ruled out organic disease. He had the advantage of a psychiatrically oriented history as sensitively taken by the intern. He also had the advantage of a family reconciled to the fact that everything else had been done. And, he had the advantage of the physical and laboratory findings as reported.

The child was seen; an unnecessary diagnostic act since the diagnosis had been made by exclusion. The psychiatric interview was, therefore, corroborative, predictive and interpretive; corroborative of the diagnosis; predictive of the efficacy of psychotherapy; interpretive to the child so he might begin the process of letting go of this destructive symptom.

The parents were not seen. On the surface this omission is a technical error. On the surface the choice of seeing the child instead of the parents or before the parents is in error in that it suggests the child is the problem and parents are innocent by-standers who have offered to stand by and help. In this case the intern had already identified the therapeutically hopeful factors in the parents — especially the mother. The desire, then, was to identify the abilities of this 14-year-old child to help his own cause.

The child is an intelligent 14-year-old boy who knows, as he enters high school and a totally different relationship with his peers, that his symptom is now too costly and he must rid himself of it. He has not moved far enough on this trail to be able to face the fact that he does have control and he has been using his soiling as an instrument of manipulation. Indeed, it frightens him to be told that he can control his bowels. To be told that he can control his bowels is to leave him sorely misunderstood. (He does not yet distinguish between the truly uncontrollable soiling of his clothes when his bowel is overloaded and the obvious ability to control when, in response to his parents' admonition, he would "go to the bathroom, and on doing so he usually would have a good bowel movement"). As noted early in this report the mother acknowledged that she expressed her own feelings toward her child when he was little. She could assert her mastery or at least her strength over him. ("At that time I could punish him if he would have a bowel movement in his clothing").

The mixed feelings of the mother for the child were reflected in the contradictory and self-defeating approach. She wanted him to have bowel movements, of course, but she wanted them in the potty. She beat him hard enough to hurt him and to frighten him. He misunderstood her surface meaning that he should use the potty and came to know that he must not have a bowel movement at all. Now the stage was set for a power struggle between the mother and child, ("at that time I **could** punish him . . . .") with defeat for both inevitable.

The bowel training period of a child's life is one of the important periods of learning self control: I can put it where it belongs; I can please my mother by doing it right; I can accede to the wishes of the larger society by ceasing to be a little stinker.

The mother's mixed feelings, her ambivalent feelings, her feelings of inadequacy as a woman or as a mother caused her to turn the mastery struggle away from her son — against — himself, changed it to a struggle of son — against — mother and son and mother — against — symptom. She worried if he did not have a bowel movement. She punished him if he did soil himself. He held his stool until it hurt to defecate which upset his mother. Or he held his stool until his bowel would leak in spite of himself. Thus, he accentuated his own feelings of inadequacy because this bad thing was happening in spite of himself. And thus, he agreed with his mother that he was defective and needed special attention to his bowel.

Enemas became a medium of social exchange between the mother and child. Going to doctors and short abortive "two weeks" attempts at correction became a medium of social exchange between the mother and child. Disappointment, anger, frustration, fear — these became the love exchange between the mother and child.

The mother lost this power struggle. The

child won and thereby lost because he is now socially inacceptable to those with whom he spends his adult life.

In simplest terms the future holds a character structure for this child of stubbornness, selfishness (withholding), self-defeat (he gains a little by constipation but it hurts and causes unpredictable passages) and sexual inadequacy (he has learned that the anus is an exciting area, able to give and take pleasure and pain).

Recommendations:

1. Immediate institution of psychotherapy for both parents. The father must be considered in this if only because he permitted the interaction between mother and child. He also chose this particular woman to be the mother of his children.
2. This child also has strength enough to contribute to his own healing, so he should receive psychotherapy.
3. A decision may well be made to treat all family members at once.

Prognosis:

Satisfactory although the strength of this malignant interaction is great and time is running out.

Admonition:

Ideas expressed concerning the psychopathology in a case like this are intended to be descriptive for the physician and therapist. One must not use such ideas loosely as interpretations nor must they be used for name calling. The parents and the child need know only that help may be available if they engage themselves intensely and seriously in goal-directed endeavor and in the search for understanding.

SUMMARY: A patient with the differential diagnosis of megacolon is presented and discussed. The consultants' discussions, in this case, depict the thoughtful approach to a medical problem from different vantage points.

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Ban on Brands — A Body Blow

There is certainly room for generic drugs. But the effort to curb the branding of all drugs would be a disastrous body blow to the public. Countless research efforts, conducted at heavy expense both in money and manpower, come to nothing. Others produce valuable but specialized drugs, needed and used by but a few people who would die without them. The successful drugs in wide use must carry the costs. There is no other way. A trade name is the producer's guarantee of quality. And it rewards research and development which mean help to sufferers from the endless ailments which plague mankind. Why put a brake on medical progress — the road to ever better health. — Editorial in **St. Louis County Medical Society Bulletin,** (32:5) February 18, 1966.

Patents — Good Health Insurance

Probably very few physicians have filed patent applications (1,600 are filed every week). And yet few other groups have benefited more as a direct result of the patent system. In 1965, for example, the pharmaceutical industry spent almost $1 million a day on research and development — seeking new and better products for the physician's armamentarium. What would happen, possibly in **days,** if the patent system fell by the wayside? Would a drug firm spend hundreds of thousands or millions of dollars on a product if, having crossed the threshold of success, it knew its competitors could gobble up the profits? — Editorial in **GP** (32:5), November 1965.

How To Go To Sleep

Let us all remember that we must not prescribe just the dosage that is given in a book; we must give enough to produce the effect we desire. Also we must not rigidly prescribe a dose every four hours; it is better to tell the nurse to give enough of the medicine to relieve pain, and when the pain returns to give another dose. I learned much pharmacology years ago when I watched a man quickly drink four martinis. He explained that he did not feel anything until he had four. And then I thought of the many times I had wondered why a man like that had to take three or four capsules of a barbiturate before he felt sleepy. —Walter C. Alvarez, M.D., in **Modern Medicine,** (34:106), March 14, 1966.

DEFICIENCY OF THE ANTERIOR LOBE OF THE PITUITARY IN ADULT MALES

The Importance of the Small Prostate as a Diagnostic Sign

By

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Many endocrine disorders owe their special interest to their colorful manifestations, their amenability to accurate laboratory appraisal, and to the reasonable promise of effective treatment which they offer. These points are nicely illustrated by a study of the syndrome due to anterior pituitary deficiency. In this paper, the clinical and laboratory features of anterior lobe pituitary insufficiency in adult males, as illustrated by seven cases, will be reviewed. Specifically excluded from this presentation will be any consideration of anterior pituitary deficiency in prepubertal males, where growth hormone is involved; anterior lobe deficiency in females, or Sheehan's syndrome; and anterior lobe pituitary deficiency due to space-occupying or surgical lesions of the pituitary with accompanying headaches and visual field defects. This discussion, therefore, will confine itself to acquired deficiency of the anterior lobe of the pituitary in adult males, due to destructive and degenerative lesions. In this group of cases, the exact etiology is impossible to determine, because no surgical procedure is involved and no biopsy material is available. In this paper, emphasis will be placed upon certain physical signs which have proved to be of diagnostic value.

Case ♯1: This 64-year-old semi-retired businessman and father of two was first examined in 1961 because of the symptoms and findings of arteriosclerotic heart disease. He also complained of weakness, fatigue, lassitude and sexual impotence for several years, but had considered these incapacities normal for his age. He had noticed a decreased need for shaving.

Physical examination was that of a pale, overweight man of 64 years, who exhibited a rather placid attitude. The prostate was unusually small. The skin was smooth, delicate, and there was a remarkable paucity of body hair, including pubic hair and beard. There was a slow return of the ankle jerks. The physical examination in other respects was considered normal.

Laboratory findings are listed in Table I.

TABLE I

Skull x-ray: normal
Kepler Power A-4.1
Urine, 24 hour 17-Ketosteroids:
Before stimulation, 4 mg.
24 hours, ACTH stimulation, 9 mg.
48 hours, ACTH stimulation, 15 mg.
Eosinophils 66 to 33
PBI: 2.8
T-3 8.5%
I-131 thyroid uptake, 24 hours: 8%
After TSH stimulation: 15%

A diagnosis of anterior lobe pituitary deficiency, as manifested by thyroid, adrenal cortical and gonadal deficiency was made. He responded satisfactorily to a program of Thyroid, Cortisone and Methyltestosterone. His cardiac condition was treated with anticoagulants and coronary vasodilators. His general physical stamina and strength increased greatly, and on several occasions since, he has volunteered the opinion that he has felt the best in many years. There was a return of normal body hair. He continues to be in satisfactory condition as of this date (1965).

Case ♯2: This 43-year-old staff sergeant was studied at a Military Hospital in May, 1963, and the diagnosis of anterior pituitary deficiency made. He consulted the military physicians because of visual blurring and visual field defects. A retrospective history disclosed that he had been struck on the side of the head in 1943, but had not lost consciousness. In the last four years, he had noted easy fatiguability, sexual impotence, mild cold intolerance and dry skin. Since 1961, he had been aware of the loss of hair from his axillas, chest and the suprapubic region. and a decreased growth of beard. He had no children.

Physical examination was that of an overweight, pale white man, who had finely wrinkled skin, absent axillary hair, decreased body and facial hair, and a female pubic hair pattern. The testicles were moderately atrophic and the prostate was remarkably small.

Laboratory findings are summarized in Table II.

TABLE II

Skull x-ray: normal
24 hour urine, 17-Ketosteroids: 2 mg. (5 and 2.9 mg.)
24 hour 17-hydroxycorticosteroids: 2.9 mg. (3 and 8.8 mg.)
Pituitary gonadotropins: less than 3 units (normal 3-30)
T-3 12.5%
Urine 17-hydroxycorticosteroids 24 hour: 8.8 mg.
ACTH stimulation 24 hour 12.5 mg.
48 hour 20.8 mg.

A diagnosis of anterior pituitary deficiency was considered justified upon the basis of laboratory data listed in Table II. He responded satisfactorily to treatment with Thyroid, Cortisone and Methyltestosterone. At the time of his most recent examination in 1965, he was feeling very well and had no visual field defect.

Case #3: This 60-year-old retired rancher was seen at his home in 1954, with the clinical symptoms and signs of pneumonia. It was also noted that his beard was sparse, body hair scant, and that the prostate was unusually small. A retrospective history disclosed that he had been incapacitated for work on his ranch for several years because of weakness and fatiguability. He had also noted impotence and loss of libido, but had accepted these symptoms as being the inevitable result of aging and had not sought any medical attention. He stated that he had found it necessary to shave only twice a week. He had fathered several children.

Physical examination was that of an overweight, pale, placid man of 60 years, with marked gynecomastia, atrophy of the genitalia, a small prostate, and delicate, finely wrinkled, almost hairless, skin. Axillary hair was absent; the beard was sparse; and the pubic hair was markedly decreased.

Laboratory findings are listed in Table III.

TABLE III

Kepler Power: A = 9.4
Urine 24 hours 17-Ketosteroids: 2 mg.
Skull x-ray: normal
BMR:-8
Blood Kahn and VDRL: positive
Liver function tests: normal

Since the diagnosis of anterior pituitary deficiency was made in 1954, he has been successfully maintained on Cortisone, Methyltestosterone and Thyroid. He was last examined in 1965 and continues to feel well. He has been able to return to part-time work on his ranch for the first time in years. He was given a full course of treatment with Penicillin because of the probability of syphilis.

Case #4: This 60-year-old disabled chiropractor was brought to the hospital emergency room in 1958 for the treatment of acute alcoholism. After he had been safely conducted through the acute stages of his alcoholism, it was ascertained that he had been unusually tired, weak and listless for about three years, and had had to quit the practice of his profession for this reason. He had been aware of the loss of normal body hair and of the decreased need for shaving for several years.

Physical examination, after his return to sobriety, was that of a drowsy, overweight, pale man, who was not particularly concerned about the obvious endocrine aspects of his illness. The liver edge was hard and smooth, and was palpable two or three centimeters below the right costal margin. The genitalia were normal, but the prostate was considerably smaller than would be expected for a man of his age. The skin was smooth, white and delicate. Body and axillary hair were absent, and the pubic hair was scanty.

Laboratory findings are listed in Table IV.

TABLE IV

Skull x-rays: Poor definition of sella
Liver function tests: normal
Kepler Power: A = 4.3
24 hour urine 17-Ketosteroids: 1.5 mg.
PBI: 3.2
24 hour I-131 uptake: 18%

He responded satisfactorily to the usual treatment for a brief period, but was lost to further followup, for unknown reasons, about six weeks later.

Case #5: This 66-year-old male was hospitalized in 1955 because of a spell of syncope which developed several hours after an injection of Procaine by a dentist. During the subsequent diagnostic studies, it was discovered that he had had an extremely low basal metabolic rate in the past, but that the prescribed Thyroid had not produced the desired effect. He had been aware of dry skin, marked cold intolerance, and the gradual loss of body hair over a considerable number of years. He also had symptoms consistent with arteriosclerotic heart disease and cerebral arteriosclerosis.

The physical examination was that of a well developed, overweight, pale, placid man of 66 years. Visual fields, determined by confrontation, were normal. Bilateral hydrocele was present and it was not possible to determine the size of the testes. The prostate was definitely smaller than normal. There was a slow return of the ankle jerks. The skin was delicate, finely wrinkled and pale; there was a scarcity of axillary, body and pubic hair.

Laboratory findings are summarized in Table V.

TABLE V

Kepler Power: A = 3.5
24 hour urine 17-Ketosteroids: 5.7 mg.
BMR: -20%
PBI: 4.8 mcgm. (had received Thyroid)
Hemoglobin 10 grams
Tests for blood loss, hemolysis, pernicious anemia, etc. were negative
Bone marrow, normal.

This patient was treated in the usual way with Thyroid, Cortisone and Methyltestosterone, with a good result. He regained much of his former strength, and there was a marked improvement in his anemia.

Case #6: This 69-year-old male was first seen in 1956, complaining of marked fatiguability and sleepiness. He had had no axillary or body hair for many years, and was not sure of the date of onset. He had previously been found to have a low metabolism but the thyroid which had been given him seemed to aggravate his general condition. There were no headaches or visual disturbance. He had noted loss of libido and sexual impotence since the age of 30. He stated that he had never shaved more than twice a week. The patient was mentally confused, and it was difficult to get a clear history from him. He had one son.

Physical examination was that of an obese, pale, lethargic, sickly man, who cerebrated and spoke very slowly. The skin was dry, beard sparse, and body hair almost completely absent, except for a few wisps of axillary and pubic hair. There was moderate atrophy of the testicles, and the prostate was unusually small. The ankle jerk exhibited a slow return.

Laboratory findings are listed in Table VI.

TABLE VI

BMR: -29
PBI: 3.6
Kepler Power: A = 8.1
24 hour urine 17-Ketosteroids: 8 mg.
After 24 hours ACTH stimulation, 9.2 mg.
After 48 hours stimulation, 12.3 mg.
Eosinophils: 97 to 11 first day, 53 to 3, second day.
Skull x-ray: Marked destruction of sella and clinoids.

It was believed that there was convincing evidence for anterior lobe pituitary deficiency, but his response to Thyroid, Cortisone, and Methyltestosterone was not satisfactory. It was suspected that the unsatisfactory results were due, at least in part, to associated senility and cerebral arteriosclerosis.

Case #7: This 59-year-old retired rancher had noted a rather rapid increase in weight, from about 230 pounds to 296 pounds, over a period of several months prior to his first examination by another physician in 1962. Marked gynecomastia, absence of chest and axillary hair, and sparse pubic hair of female distribution were noted. The genitalia were atrophic, and the prostate was small. The examining physician in 1962 had found the basal metabolic rate to be +11; the 24-hour 17-ketosteroids, 3 mg.; the 24-hour urine

17-hydroxycorticosteroids, 3.3 mg.; and the protein bound iodine, 3 mcgm. The skull x-ray was normal. A diagnosis of anterior pituitary deficiency had been made, and he had been started on treatment, probably with Prednisone. Generally, the response was unsatisfactory.

He was re-evaluated in March 1965, because of symptoms of bladder neck obstruction, which had been present for several months. He recalled at that time that he had been thrown from a horse in 1943, landing on his head. This accident made him "silly" for a time, but it did not appear to cause loss of consciousness. He believes that his weight problem might have started at that time. His skin had been drier than usual for several years, and he had been intolerant of cold. For several years, he had been aware of a great loss of strength and energy, and was unable to carry on the usual duties of running his ranch. For several years, he had been satisfied to shave only once a week. He had fathered two children in the past, but had noted complete sexual impotence in the past five years. There were no headaches or visual problems.

Physical examination revealed atrophic genitalia and a prostate which was much smaller than would be expected. The skin was dry, delicate, and smooth. Body hair was remarkably sparse, and there was very little axillary hair. Pubic hair was probably normal in amount but arranged in a female pattern.

The laboratory findings are listed in Table VII.

TABLE VII

Skull x-ray: normal
PBI: 3 mcg. in 1962, 6.4 mcg. in 1965
24 hour urine 17-Ketosteroids: 3 mg. in 1962
24 hour 17-hydroxycorticosteroids: 4.9 in 1965
ACTH stimulation 24 hour, 11.5 mg.
48 hour: 21.7 mcg.
Kepler Power: A = 2
Skull x-ray: normal
24 hour I-131 uptake: 2.7% (on Thyroid)
Buccal smear: normal
TUR tissue: Bladder neck tissue with inflammatory reaction.

The previously made diagnosis of anterior pituitary deficiency was confirmed, and he was started on treatment with Thyroid, Methyltestosterone and Cortisone. On this program, he has done satisfactorily.

COMMENT AND DISCUSSION

The term, **pan**hypopituitarism, often used to designate the condition described above, would appear to be inaccurate because it fails to take into consideration the fact that pituitary failure may be incomplete and selective. The prefix "pan" implies that the deficiency must always involve all of the trophic hormones and functions of the pituitary. The term "selective pituitary failure" has been used to designate the failure of one or two of the trophic hormones, without involvement of the others, and has been documented in the literature.[1, 2, 3] The anterior lobe of the pituitary obviously produces more hormones than gonadotropin, thyrotropin and adrenocorticotropin, but these three happen to be those which involve target organs whose functions can be clearly evaluated by clinical and laboratory means.

Much of the discussion of anterior pituitary deficiency in the literature concerns that in prepubertal males, in females of menstruating age (Sheehan's syndrome), and in those cases due to chromophobe adenomas associated with severe headaches and visual field defects. Since these conditions are being excluded for the purposes of the present discussion, there is a relative dearth in the literature concerning the present problem as limited above. Peters and Associates[4] reported a series of 34 cases of pituitary failure and concluded that the majority are due to intracranial tumors, particularly chromophobe adenomas. In Cases ♯2 and ♯6 of the present series, there is some possibility of a neoplastic lesion, but the lesion, if present, did not progress to the point where any surgical intervention was indicated. The exact cause of pituitary failure must remain unknown in all seven cases presented here. It would seem logical that deterioration due to arteriosclerosis, infarction, and related vascular and degenerative processes might explain most of the lesions. One is tempted to speculate whether head injury might have caused the deficiency in Cases ♯2 and ♯7. Altmann and Pruzanski[5] reported a case of post-traumatic hypopituitarism in 1961, and reviewed the literature at that time. They were able to find 14 case reports of post-traumatic hypopituitarism. The presence of a positive serology in Case ♯3 makes one wonder whether a fortuitously placed gumma might have caused the destruction of the pituitary in this instance.

Ordinarily, the diagnosis of deficiency of the anterior lobe of the pituitary depends upon the recognition of the clinical and laboratory findings of deficiency of the three principal target organs, namely the thyroid, adrenal cortices and the gonads. The functional status of the thyroid and of the adrenal cortices lends itself nicely to accurate laboratory measurement, but obviously, no laboratory approach can be applied unless the condition is suspected on clinical grounds. VanArsdel and Williams[6] state that "in the majority of patients with pituitary deficiency, the clinical findings should be sufficient to indicate the diagnosis." The unique clinical symptoms and findings of hypogonadism, which is presumed to be due to pituitary failure in many cases, assume considerable diagnostic significance, in alerting the clinician to the possibility of pituitary involvement. This point might be epitomized by stating that the recognition of hypogonadism is frequently the easiest avenue by which the diagnosis of anterior lobe pituitary deficiency can be made. Howard and Bailey[7] have stated that "gonado-

tropic hormone deficiency accounts for many of the overt clinical features of hypopituitarism."

The symptoms of thyroid deficiency, as well as those of adrenal cortical insufficiency, are not very dependable and are notoriously difficult to differentiate from neurotic manifestations. The recognition of the physical signs of thyroid deficiency, such as dry skin and the myxedema reflex, if conspicuous enough, is often good reason to order thyroid function tests. The signs and symptoms of thyroid deficiency, when secondary to pituitary failure, are often modified enough to make them even more difficult to recognize. Peters and Associates[4] have called attention to the fact that the detection of hypothyroidism in patients with hypopituitarism is peculiarly baffling, because the disorder does not express itself in the fully developed picture of myxedema in many cases. Likewise, Addisonian pigmentation, which is usually considered the hallmark of primary adrenal cortical insufficiency, and is therefore the principal diagnostic sign of primary adrenal cortical insufficiency or Addison's disease, is not present when the adrenal cortical insufficiency is secondary to pituitary failure, because of the absence of the pituitary stimulating effect upon the melanophores.[3, 9] There are, therefore, no dependable or characteristic physical signs which serve to suggest adrenal failure secondary to pituitary failure.[10]

The symptoms of gonadal insufficiency in the male may be several. Pituitary gonadotropins include the follicle stimulating hormone which stimulates the semeniferous tubules and the luteinizing hormone which stimulates the Leydig cells of the testicles. Secondary male sex characteristics are determined by androgens which arise both from the Leydig cells of the testicles and the adrenal cortices. In view of the fact that most cases of anterior pituitary deficiency in the male seem to occur in the middle-aged or elderly, whose wives are likely to be beyond the child bearing age, there is little likelihood that a routine history will disclose evidences of deficiency of the semeniferous tubules. The symptoms of Leydig cell failure resemble the symptoms of adrenal cortical and thyroid failure. The principal symptoms of Leydig cell failure would appear to be lack of strength, loss of libido and sexual potentia, and as such, are not likely to be discussed in the usual routine history.

There are, however, some clear, objective, physical signs of Leydig cell and adrenal cortical failure, or androgen insufficiency, which are easily recognizable at the bedside. These findings are the acquired loss of normal body hair and a decreased size of the prostate. The literature abounds with references to acquired loss of body hair as a sign of male hypogonadism, but has very little to say about the decreased size of the prostate. Altman and Pruzanski[5] and Rothfeld and Rodas,[11] make brief mention of the small prostate as an incidental finding in hypogonadism, and hypopituitarism, but do not emphasize that the finding of the small prostate has diagnostic value. From the present observations, it would appear that a prostate of smaller than usual size has the same significance as the acquired loss of body, axillary, pubic and facial hair, and therefore serves as a useful clue to the existence of male hypogonadism and anterior lobe pituitary insufficiency.

In several of the cases described above, the small size of the prostate was the diagnostic sign which suggested the final diagnosis. Most physicians who are accustomed to doing rectal examinations on all males probably have their computer-like minds "rigged" to determine whether the prostate is normal or large, but do not pay particular attention when the prostate is smaller than usual. The prostate appears to be of special interest to the urologist when large, but of special diagnostic interest to the internist or endocrinologist when small.

In the differential diagnosis, consideration should be given to chronic liver failure, and Klinefelter's syndrome. Chronic liver disease usually presents no diagnostic problem because of its distinctive history, physical signs and abnormal liver function studies. Klinefelter's syndrome is characterized by excessive weight, gynecomastia, testicles which may be normal or atrophic to palpation, characteristic microscopic changes in the semeniferous tubules in testicular biopsy, and a diagnostic positive chromatin pattern by buccal smear.

It appears proper to re-emphasize clinical characteristics of anterior lobe pituitary failure in adult males which were shared by all seven cases described above. All seven of these men were overweight; most of them had a placid relaxed attitude, and were not particularly concerned about their endocrine disorder; all had decreased amounts of facial and body hair; and all had small prostates. None of them was emaciated, as in the classic textbook picture of Simmond's disease carried in some of the older textbooks. In several instances, the diagnosis was made by accident because of the recognition

of decreased body hair and a small prostate, which findings were not the reason for the patient's consulting a physician. Except for two cases in which there is a possibility of a chromophobe adenoma causing the clinical picture, most of them can be best considered as being due to degenerative changes, atrophy, infarction or other degenerative or vascular processes.

CONCLUSION

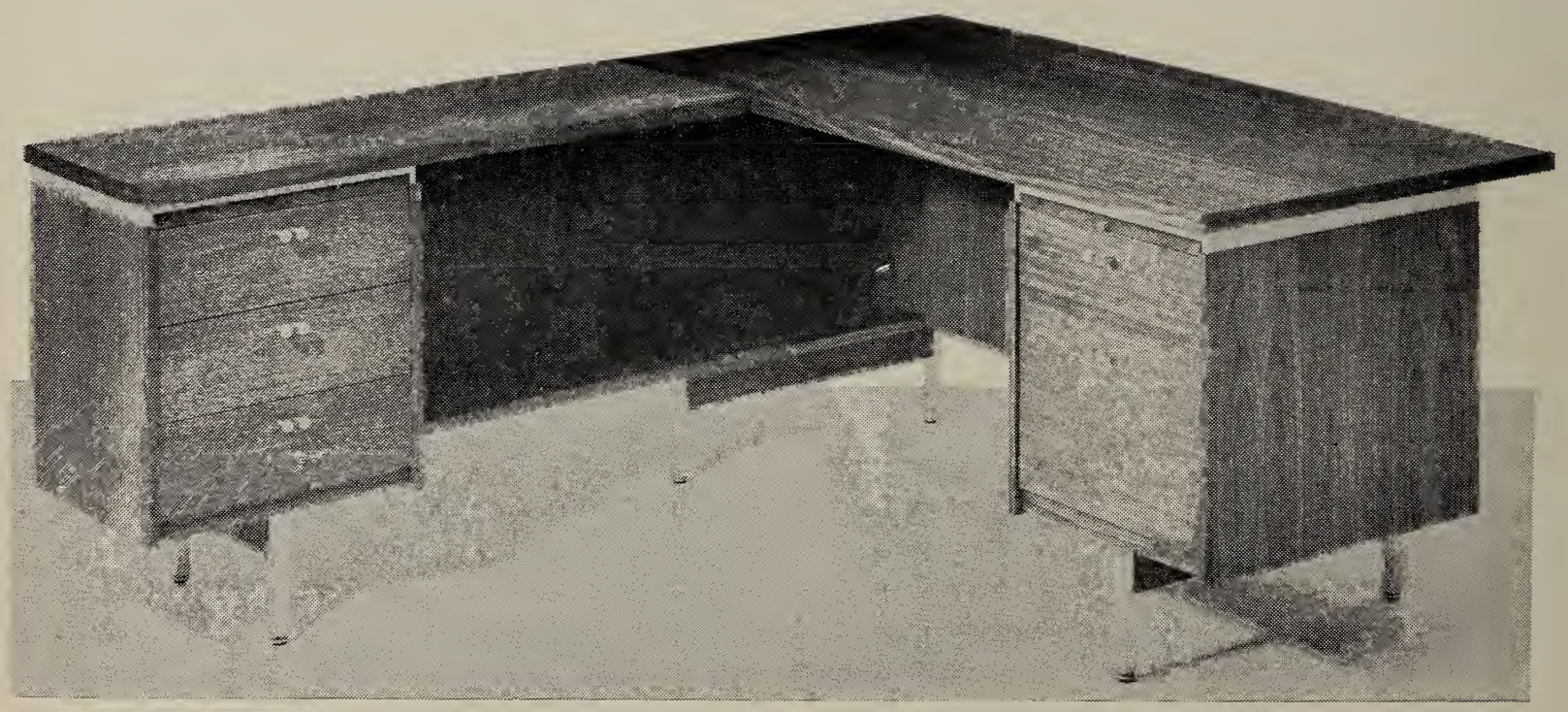
A series of seven cases of acquired anterior lobe pituitary deficiency in adult males has been presented. All were overweight, pale, placid and relatively unconcerned about their principal endocrine disorder. All presented objective signs of androgen deficiency, which is presumed to be due to deficiency of both the Leydig cells of the testicles and of the adrenal cortices, and therefore secondary to pituitary failure. The signs of androgen deficiency include acquired loss of body hair and the decreased size of the prostate. The decreased size of the prostate as a physical sign of deficiency of the anterior lobe of the pituitary is stressed.

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DELIVERY AND THE DEFECTIVE CHILD
THE ROLE OF OBSTETRICS

By

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The statistics on mental deficiency and neurological defects in the United States are both impressive and impersonal. About 3% of the adult population have been classified as either morons or sub-morons. The majority of these people (about 90%) have no neurological findings of a clinical nature and can only be distinguished from their fellow citizens when they begin to encounter scholastic competition. The minority (about 10%) may have not only some intellectual impairment, but have superimposed motor defects as well. It is this group with which the obstetrician is, at present, most concerned. He is concerned because if he does a moderate amount of obstetrics, he will deliver at least one defective or spastic child for every year he is in practice.

The subject of the defective child frequently raises deep feelings of anger, guilt, and frustration not only in the parents of the child involved, but also in the physician and the educator who work in the field. Even the various terminologies in use such as "defective," "subnormal," "exceptional," "retarded" and "brain damaged or injured," tend to reflect this feeling. Many times parental feelings of guilt are transferred to another individual; the physician, and particularly the obstetrician, is a logical choice. There is always some event, some detail of omission or commission during the pregnancy or delivery, that the mother can recall as having a relationship to the ultimate fate of the child. The use of such terms as "brain damage" or "birth injury" are meaningless but tend to re-enforce these beliefs. There is frequently a subtle pressure on the physician to make or use such diagnostic terms which imply a traumatic or organic basis for the deficiency and thus relieve feelings of guilt.

ETIOLOGICAL STUDIES ON THE DEFECTIVE CHILD

Very little is known concerning the etiological factors in the vast majority of individuals who develop intellectual deficiencies in later life. This majority comprises a vast, etiological heterogenous mass where the confusion is only compounded by the consideration of the important roles of social-economic conditions and psychological influences. Not only are the etiological factors obscure, but recent advances in the subtility of diagnostic techniques and developmental knowledge make it probable that a great many of these individuals have erroneously been diagnosed as being retarded or defective. Developmental disorders such as learning or language are not necessarily related to intelligence.

The obstetrician must, of necessity, be primarily concerned with the etiological factors which are active when the infant has become defective as a result of prepartum influences or intrapartum complications.

Since spastic paraplegia is easy to recognize before the first year of life, most of the etiological studies on the defective child have been based on this group of diseases in which there is central nervous system involvement. Unfortunately, from the obstetrical standpoint, it is frequently impossible to determine if the etiological agent or agents responsible for the spastic infant occurred in the prepartum, intrapartum or even postpartum period. About 14% of all individuals with cerebral palsy are known to have acquired it after a period of normal neonatal development.

Despite the complexity of the problem, a number of excellent studies on the obstetrical factors in this disease complex, have been made. These studies take two forms. In the more common retrospective study, a selected group of defective children along with a control group, are compared on the basis of all available medical information such as birth certificates, prenatal records and the hospital labor and delivery records. In prospective studies, on the other hand, a selected group of children whose

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SEARLE

Research in the Service of Medicine

mothers showed an abnormal prenatal history, labor or delivery, are compared with a control or sibling group by means of various neurological and psychological examinations. Both methods have obvious limitations, not the least of which is the professional bias of the investigator. Would a neurologist, a pediatrician, and an obstetrician evaluate a labor record in the same manner?

Retrospective studies tend to show that an "abnormal" obstetrical history can be obtained in 60% to 80% of all defective (spastic) children; this history includes not only the various complications of labor and delivery but such diverse maternal conditions as a high incidence of multiple pregnancies, prematurity, toxemia of pregnancy, and prenatal vaginal bleeding. Prospective studies do not minimize the importance of the obstetrical complication of labor and delivery but these studies do show that the majority of infants who survive these complications will grow up to be normal children.

To the clinician doing obstetrics it seems highly questionable that such complications as vaginal bleeding in the first trimester, nuchal cord, and toxemia per se, play any part in the etiology of the defective child. Mothers who give birth to defective children show a much higher incidence of all obstetrical complications and accidents throughout their reproductive career. Not only is there an increase in the abnormalities of labor and delivery as previously mentioned, but these mothers also show an increased incidence of abortion, fetal, and neonatal loss in other pregnancies. These facts would tend to indicate that there is operating in the mother of the defective infant, some factor or factors resulting in a high reproductive casualty.

THE ROLE OF LABOR AND THE FETAL PELVIC RELATIONSHIP

For over a century, it has been known that there exists some correlation between a complicated labor, anoxia, and the subsequent development of the defective infant. In most studies, which seek to determine the etiological agents responsible in labor and delivery, great reliance has been given to the logical but unproven theory or assumption that the lethal factors responsible for perinatal death will, if of lesser intensity, or of shorter duration, be capable of producing a defective child instead of a dead one. The causes of intrapartum and neonatal death are fairly well known and have been quite uniform throughout the United States. Both retrospective and prospective studies associate severe fetal distress (intrauterine anoxia), and labor or delivery trauma, with or without intracranial hemorrhage, with an increased incidence of neonatal morbidity and mortality.

Prolonged labor has not been associated with an increased incidence of cerebral palsy. However, a prolonged second stage of labor associated with contractions of high intensity, long duration and short frequency is a potential source of the defective child. Of greater importance and until recently overlooked, is the very short or precipitous labor which probably accounts for four times the number of defective infants than does normal labor and three times that seen in prolonged labor with a long second stage.

The fetal pelvic relationship, which would include labors where cephalo-pelvic disproportion and mal-presentations are factors, lead to dystocia, intra-uterine anoxia and traumatic delivery and therefore, an increased incidence of defective infants. Of the various malpresentations, breech delivery is most important because of its frequency. Retrospective studies have shown that the number of breech deliveries in spastic children is three times (15%) that of the control group.

THE ROLE OF ANALGESIA AND ANESTHESIA

Spastic infants show a high incidence of respiratory difficulty at birth but evidence linking analgesia and anesthesia, either conductive or general, with perinatal death or the defective child, is lacking. Infants born with very low Apgar scores, who do not breathe or cry after several minutes, have a severe congenital defect, or have been subjected to intrauterine anoxia or delivery trauma. Anesthesia and analgesia may account for an infant with a temporary apnea, but even in mothers who receive no anesthesia, the incidence of apnea in the newborn is about 7%.

Infants requiring prolonged resuscitative measures particularly if due to anoxia, do not necessarily result in a dead or defective child. There have been several cases reported where an infant who was believed "stillborn" or "moribund," was successfully resuscitated and subsequently developed no intellectual or neurological defects. It is comforting for the physician to tell the parents that, "It's a good thing the baby didn't live because it would have been abnormal," but it is not necessarily so.

THE ROLE OF BIRTH TRAUMA (BIRTH INJURY) AND FORCEPS

All infants who die or become deficient as a result of the events of labor or delivery whether due to cord or placental accidents, short labors, malpositions, or trauma, do so because of "birth injury." One might as well say that all post-operative deaths are due to "surgery." Birth trauma is a better term to describe the infant who suffers a traumatic delivery or who has had an intracranial (or intraspinal) hemorrhage.

Traumatic delivery, with or without intracranial hemorrhage, is usually the result of an abnormal fetal-pelvic relationship and commonly follows attempted delivery using version and extraction, breech extraction, and high forceps. Spastic children have a history of abnormal delivery in about 30% of their mothers compared to a control group of 10%.

Traumatic intracranial hemorrhage is usually of the subdural or subtentorial type. About 25% of intracranial hemorrhages, however, follow no significant maternal complications and occasionally may occur before the onset of labor. Infants born with intracranial hemorrhage, regardless of the cause, may show no neurological defect in the first several weeks or months of life, if the lesion involves only the cerebral hemispheres. The infant who is in poor condition at birth with cyanosis, periods of apnea, and gasping respirations, has had an injury (hemorrhage) of the brain stem or upper spinal cord. The great reduction in traumatic intracranial hemorrhage from an estimated 50% to 80% of fetal and neonatal deaths as late as 1921 to less than 5% the past few years is one of the great accomplishments in obstetrics. The decline in obstetrical trauma reflects itself in the decline of the number of defective children from this cause. A history of delivery trauma is found in about 5% of spastic children.

The word "forceps" has about the same connotation to many parents as the words "blood," "damage" and "force." A bruise on the infant's head is synonymous with "brain damage" or "birth injury." High forceps are obsolete to-day and have been replaced by abdominal delivery. Thus, many of the studies on the defective child which include this procedure are no longer valid. Central nervous system injury with mid-forceps applications can occur, but in most cases it is impossible to determine if the injury is due entirely to the operation or due to the condition under which the procedure would be used, such as fetal distress, prolonged second stage, and abnormal labor mechanisms. There is one study of 317 cerebral palsied children in which the incidence of forceps application was less than in the control group. Low (or outlet) forceps play no role in the etiology of the defective infant. Compressive forces in low forceps approximate those present during the second stage of spontaneous labor and many obstetricians believe that low forceps will reduce the incidence of fetal and neonatal mortality and morbidity when used routinely.

THE ROLE OF INTRAUTERINE ANOXIA

Hypoxia or relative anoxia is a normal physiological feature of human intra-uterine life, where the oxygenation saturation of arterial blood is about 50% to 60%. Although the fetus is more tolerant of anoxia than the adult, the exact level or the time this level must be maintained, before organic brain changes occur is unknown. Fetal distress probably occurs at oxygen saturation levels under 30%. Intrauterine anoxia remains a clinical diagnosis, however, and can not be determined in the laboratory, on the basis of cord blood saturation studies.

About 25% of fetal and neonatal deaths involve anoxic complications of labor and delivery. As mentioned previously, there probably exists a correlation between the factors responsible for these deaths and the factors responsible for the defective child. Although only a small percentage of infants (10%-15%) who suffer from severe intrauterine anoxia will show permanent neurological sequelae, a history of labor complications in which anoxia may be a feature is found in about one-half of all cerebral palsied children. The effect of intrauterine anoxia on later intellectual development is less clear; at least one extensive study has shown that infants with a history of severe anoxia show a greater variation in intelligence than in normal controls, that is, there are more children showing a superior I.Q. as well as more children showing a low I.Q. than the normal group. These findings lead to the interesting speculation that if intrauterine anoxia is responsible for some of our dim witted citizens, it may also be responsible for some of the geniuses.

THE ROLE OF PREMATURITY AND TWINNING

Prematurity in terms of actual gestational age or birth weight has a close relationship to the defective child in both retrospective and prospective studies. The incidence of intellectual

or neurological defects is inversely proportioned to gestational age or birth weight.

About 20% to 35% of spastic children were born prematurely. This compares to an incidence of about 10% in normal controls. At the age of eight months, about 4% of these premature infants will have some sign or symptoms of a neurological defect while 3% will become spastic children.

About one-third of the premature infants also show some intellectual impairment at eight months of age, compared to 8% in mature siblings using the same psychological tests. Although the brain of the premature is more susceptible to hemorrhage of the anoxic type than the mature fetus, this fact undoubtedly is only part of the story.

There is an incidence of 6% to 10% of twinning in spastic children. Since most twins are premature and since the second twin carries a higher mortality rate due to complications of labor and delivery, this is not surprising.

THE ROLE OF MISCELLANEOUS MATERNAL FACTORS

Parity appears to play no role in mothers who give birth to defective children. Maternal age, if the mean age is used, also is not significant; however, at least one study reveals a higher incidence in mothers over 35 years old. Rupture of the membranes when prolonged, is also associated with a higher incidence of defective children. Induction or stimulation of labor appears to play no significant role.

It is quite apparent then, from the discussion, that while obstetrical factors are important in the etiology of the defective or spastic child, the exact cause or causes in the majority of cases remains unknown. The reduction of traumatic deliveries and intracranial hemorrhage, as well as the advances in the treatment of the erythroblastic infant, have not resulted in a corresponding decline in the incidence of defective children. There appears to be a maternal type who shows a higher incidence of reproductive wastage, both early and late, in whom the defective child commonly appears. This leads to the speculation that some common etiological factor or factors is present in these mothers. One could further speculate that the recent dramatic advances in cytogenetics and biochemical-metabolic diseases may furnish some of the answers to the distressing problem of the defective child.

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DEADWOOD DOCTOR

Frank S. Howe, M.D.

CHAPTER II
Farm to M.D.

My father, Dr. Joseph Howe, was of English-Irish descent, English on his father's side. His mother's folks were largely Irish descent. My mother's family came over very early, about Revolutionary days or before, I believe. On my mother's side, the Stewarts were Scotch and the Beales were Irish. Both my father and mother's folks lived in Western Pennsylvania. My mother's people lived in Westmoreland County and my father's people in Allegheny County near Tarentum, Pennsylvania. My mother lived near Parnassus, Pennsylvania. The Stewart farm, an original homestead, was a grant from William Penn and is still owned by the family. Both my mother and father were raised on farms.

My father enlisted in the Civil War. He was in two years or more and when he came back he went west to Iowa, which was then far west. He taught country school for two years there. After that, he decided he wanted to study medicine and went to Philadelphia. At that time it took only two years to be a doctor, so in two years he got his medical degree. He first located at a small town east of Pittsburgh on the Allegheny River. When he got married, he moved to the town of Industry on the Ohio River, about six miles from the Ohio line.

After he had practiced for a year or two, father decided that he didn't know any medicine, that he was a doctor in name only, and he wanted to take a post-graduate course. Mother thought that this was a disgrace, that it was an admission of lack of knowledge. My father was a student and a great reader. My mother was a very practical person. About that time, there was a farm offered for sale. The house was in the village limits and the farm adjacent to it, just outside the town. My mother's family had always been farmers, and she was unhappy unless they owned a farm, so they purchased the farm and moved into this house. That was where I was born.

I was second in a family of 6, but one boy lived only two months. He died of bronchopneumonia so only 5 lived to grow up, three girls and two boys. All are living in California. The oldest sister is dead. She was living in California at the time of her death. She died several years ago.

My father's fees were 25c for an office call, including medicine; 50 cents for a house call and $5.00 for an obstetric case. Those were the first fees that I can remember. He later with fear and trembling put his prices up to 50 cents for an office visit, $1.00 for a house call, and $10.00 for an obstetric case. These were the highest fees he got. He mixed his own medicine. He had a mortar and pestle and his favorite mixture was blue mass pills. I tried one and concluded that any patient would get well rather than have to take any more. It became a habit with me to taste some of the various mixtures. I, one day, tasted quinine and it seemed it took me a week to get the taste out of my mouth. I also had to taste his strychnia powder which is just about equally bad.

We had no telephones in those days. My earliest recollection was in hearing some man way in the night calling, "Hey, Doc." My father would raise the upstairs window of his bedroom and ask him what he wanted. The man would tell my father who it was he wanted him to see and that is the last I would remember. He dressed and went out into the night. I went to sleep again.

While most of my playmates were village boys, in fact, practically all of them, I was a farm boy and from the time I was big enough to work at all, there was always work to do. It seemed that the village boys always had time to play, at least that's what they said and that was all I heard. They would come to see me and I would have to work, and they would say, "You are always working. We can't play with you." I got to telling my father about this and asked why I couldn't have a day off.

Father was quite a psychologist. One day when I was a pretty good sized lad, he said, "Well, you just do your morning chores then you can take the day off. You don't need to do a thing today after the morning chores are done but come back about 4 o'clock to take care of the evening chores, getting in the cattle and milking."

After the morning chores were done, I rushed down to the village but couldn't find a single boy who wasn't working. I could find no playmates so I went to the village store. At that time the whittlers and story tellers were all Civil War veterans and all they did from early morning until late at night was spit and sit around telling stories. I sat and listened until noon when I went home and had my dinner, then went back and waited and waited for 4 o'clock to come.

I couldn't go home before 4 o'clock as that would have been an admission that I wasn't having any fun. At 4 o'clock I went home and had supper. My father asked me if I had a good time. I said, "Yes, yes, I had a good time." I know he was laughing to himself. A little later the same year he asked if I wouldn't like another day off and not have any work to do. I declined.

From the time I was about 14, I had complete charge of the farm work because my father was very busy with his country practice and he did a lot of medical reading. Of course, at that time, I thought he always read when there was work to be done. I went to the village country school, a two-room school, until I finished there. I then went to a tuition academy conducted by a Professor Piersol. It was a school that had a great reputation in that part of the country. It was sort of like the high school of today but they never graduated anybody. One could go as long as he wanted to. We commuted there (it was only about 7 miles away). We took a train in the morning and back in the evening. There were about six of us who usually went back and forth on this local train. We lived only 34 miles south of Pittsburgh, which was our nearest city.

While we were going to school the first dam to be built on the Ohio River to make slack water was put in about 4 miles away at what we called Merrill. A frame hotel was put up to accommodate the workers and there was a station stop there. One night there was a fire and the hotel burned. Four or five waitresses were trapped in the building and burned to death. When we stopped there, we all dropped off the rear coach to see what this was like. The bodies were covered with sheets and some curious person threw one of the sheets off so they could inspect the bodies. I saw a scarred black trunk of one of the waitresses and that was all I did see. I got so sick that I didn't know where I was and dragged myself up the steps by the hand rail. I wasn't so sure then whether I wanted to be a doctor or not.

After going to the academy for some four years, I entered Geneva College at Beaver Falls, Pennsylvania. That is the only Reformed Presbyterian College in the United States. It was conducted by the Reformed Presbyterian Church, known as the Covenanters. The college was small but had very high scholastic requirements. Fraternities were absolutely forbidden. They allowed no musical instruments in their services. Chapel was compulsory. After four years at Geneva College I graduated.

The year I graduated I had an opportunity to teach at a so-called normal school near Indiana, Pennsylvania, where teachers and those preparing to teach were trained. Between my junior and senior year, my father wanted me to take a teacher's examination. He had been a teacher and wanted me to have a teacher's certificate. I wasn't greatly interested but my father insisted on my taking the examination. I flunked in one subject. That disgraced my father very much to think that I had failed and didn't get a teacher's certificate. After I finished my senior year, I went to teach at this normal school where there were teachers and those preparing for a teaching career on a tuition basis. I stopped at a farmer's place — his name was Miller. He was president of the school board, president of the board of trustees of the church and a very important man there.

The first evening the family all gathered together. A college graduate was something rare there, so the father thought he would trip me up. He started quizzing me. One of the first questions he asked me was how much alcohol there was in whiskey. I told him that right off. Then he asked the next question of what else there was in whiskey other than alcohol? I could not answer the question. I didn't think about water; that was too common, but we became very fine friends. They were wonderful to me.

I was even asked to make the Memorial Day address which was a big event then, but they got a lawyer or a preacher and I was excused. I was greatly relieved as I had no idea what to say.

After I had finished that work which had been very difficult — I had to stay up every night after midnight to keep ahead of some of the very bright students — I went home and again took the examination for a teacher's certificate. I passed with the highest grades ever given then. I applied for various schools, hoping I wouldn't get one. My father wanted me to teach for a year or two, but I wanted to go on to medical school.

In those days you didn't apply personally, you sent your picture. I guess the picture didn't go over so good because I didn't get a school. During that summer, we had a family conference about what profession I would take up. My mother decided a preacher was the best and my father decided that being a lawyer was the best profession, anything but a doctor, that was a

dog's life. So after the arguments were in he asked me what I thought. I said I wanted to study medicine.

My father said, "All right, where do you want to go?" He wanted me to go to Philadelphia to the University of Pennsylvania, but I decided I wanted to go farther west and I entered Starling Medical College at Columbus, Ohio, which was then a well known medical school. I enjoyed it there very much but after spending a year there I decided that there were not sufficient clinical advantages, so I transferred to Chicago to the Physicians and Surgeons Medical College which was the Medical Department of the University of Illinois at Chicago. I found that the clinical advantages there were fine. We worked at Cook County Hospital and other hospitals, and I graduated from there, taking the four year course in three years under Dr. J. B. Murphy, A. J. Ochsner, Wm. Quine, Dr. K. Steele, A. H. Ferguson, Dr. Thomas Davis and others.

My father enjoyed a post-graduate course while I was in the final years. We spent all spare time each summer discussing medicine and medical subjects. I know now that my father, although he had only two years of medicine and little chance for clinical advancement, had a remarkable record of achievement. The most common diseases then were pneumonia and typhoid fever. I have no recollection of his ever having lost a case of pneumonia. His favorite drug in pneumonia cases was veratrum viride. He would start giving the drug immediately, watching the pulse. When the pulse was brought down to normal, he cut down the dosage. I have no recollection of his ever having lost a typhoid fever case until he called in consultation a young physician from the nearby town of Beaver, and he told him about the wonderful new drug that they were using in typhoid fever. It was known as antikamnia, which was mostly composed of acetanilide. It did a wonderful job of bringing down the temperature but the patients died of heart failure. After losing three typhoid fever cases in succession, he decided that he had better go back to his old methods of bathing, calomel and supportive treatment. He did not lose another case. He naturally had quite a large obstetric practice. I have no recollection of his ever having lost a mother during his entire term of practice.

When I was in medical school on the West side of Chicago, where most of the medical schools were located, there were a great many restaurants that served 15 cent meals. Without a meal ticket, our meals cost us 35 cents a day, 5 cents for breakfast, 15 cents each for dinner and supper. By buying a meal ticket, our cost was cut down to 28½ cents a day. There was one restaurant near the medical school which was quite popular with the students. At a time when all of us had just bought meal tickets, we rushed to breakfast one morning so as to make an 8 o'clock class, and we found the doors locked. We had a very dismal crowd of boys around there, but after a day or two of watchful waiting, the restaurant re-opened with another proprietor who agreed to honor our meal tickets provided we each bought another new one, which of course all of us did. So that crisis was averted and we started to eat again.

On Saturday afternoons we had a surgical clinic conducted by the late Dr. D. A. K. Steele. This was about the most practical clinic of the whole week. It usually consisted of opening boils and abscesses, treating infected wounds, amputating fingers; but to us, especially during our senior year, that was peanuts. It was beneath us. We wanted to watch Caesarean sections, hysterectomies and really big operations that most of the fellows would never do.

Having a rather large class, we adopted a practical solution in which we arranged for a friend to answer roll call for us while we went down town to attend one of the matinees. By going down on the El for a 5 cent fare and going to "nigger heaven" for a 25 cent admission, we saw all of the best actors and actresses who were on the stage at that time for a total expenditure of 30 cents. We walked back some 6 miles and always had to go in crowds, usually five or six of us together, as part of this district was West Madison, Halstead and Maxwell Streets. It was absolutely dangerous in daylight for anyone going alone. We saw Richard Mansfield, James K. Hackett, Elsie Janis, Alice Neilson, Amelia Bingham, Ethel Barrymore, Henry Irving, Ellen Terry and many others, in fact, practically all of the great actors and actresses of that day for a total expenditure of 30 cents a trip.

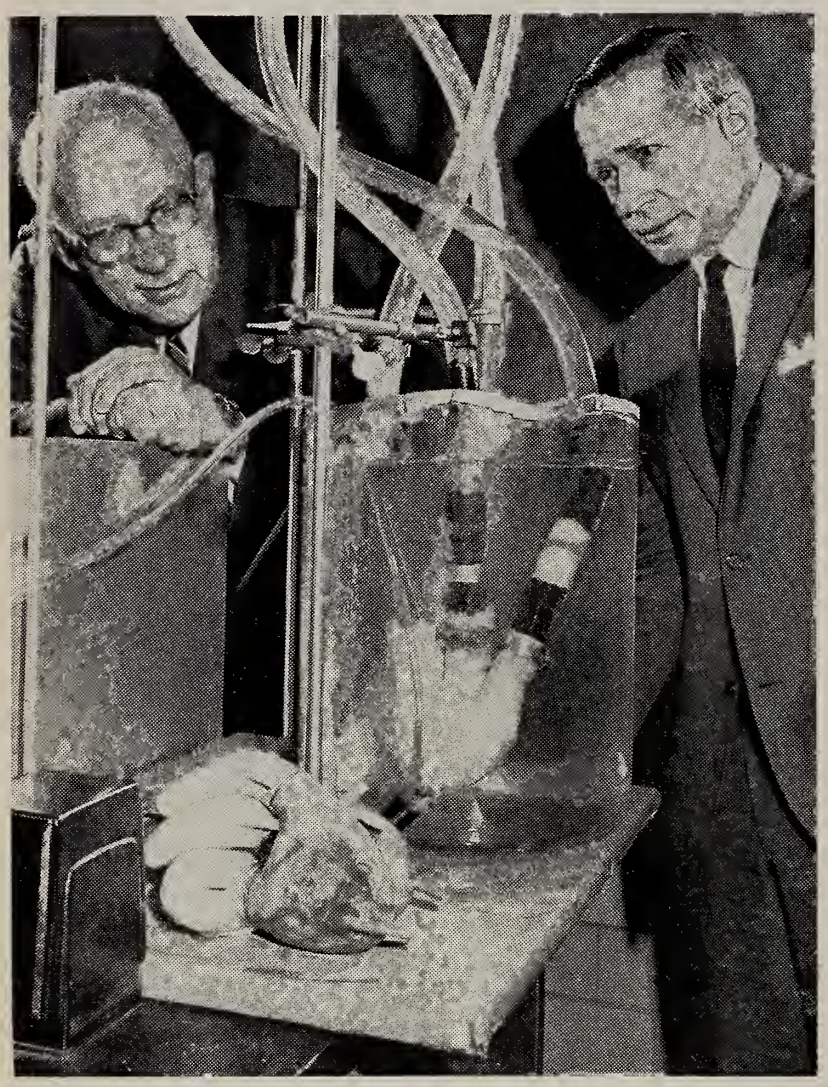
Our work was so strenuous that by Saturday afternoon we were so fed up that had we stayed in school, we would have gotten very little out of it.

I had an excellent hospital appointment when I finished school but again my mother being practical minded said, "You have finished school now. It is up to you." I had not the slightest

idea at that time how to finance myself except through advances from my family. I would never have occurred to me to borrow money either from a bank or some friend. To me, at that stage, a bank was merely a place to put your money for safekeeping.

So I pushed aside the thought of the hospital appointment for the urgent necessity of earning my living, and found myself, as I said, in Deadwood, S. D., with my F. S. Howe, M.D. shingle hung above Deetken's Drug Store.

(To be Continued)



PROTOTYPE of the artificial heart that Dr. Michael DeBakey, famed Houston heart specialist, recently predicted would be successfully implanted in a human within three to five years is examined by his associate, Dr. George C. Morris, Jr. (right), with A. J. Gracia, research vice president of The Goodyear Tire & Rubber Company. Dr. Morris, also of Houston, inspected the rubber heart at Goodyear's research laboratories in Akron, where company scientists, in cooperation with Cleveland (Ohio) Clinic doctors, have been perfecting the artificial organ for five years. Dr. DeBakey implanted a partial artificial or "half heart," known as a left ventricular bypass, in a patient who lived for several days. Dr. DeBakey made his three-to-five-year prediction on the TV program "Meet the Press," May 1, 1966.

Live and Learn with New Drugs

There is no simple answer to the question "How Safe are Drugs?" The effective drugs available today have varying degrees of potentiality for producing harmful effects. Can drugs be developed with such specificity of action that all effects but the one desired would be eliminated? This is something to hope for but the reactive mechanisms of the body may also have limits of specificity. If we have to live with new drugs which occasionally produce adverse effects, less trouble will occur if the physician uses them wisely. He can do this only by learning as much as possible about them before he prescribes them and then passing along any additional information gained from his own experience. — Ralph G. Smith, M.D., in **Journal of New Drugs,** (6: 62-68), January-February, 1966.

GENERAL PRACTITIONER URGENTLY NEEDED: Small community near Sioux Falls is looking for a general practitioner to occupy new, fully equipped, air conditioned building. Other communities in immediate vicinity are also without physician. Area offers excellent recreational facilities — fishing, good pheasant hunting, and deer hunting. Interested physicians should contact Mr. W. L. Meyer, Humboldt, South Dakota 57035.

WANTED: General Practitioners and Pediatrician to join expanding Northwestern Wisconsin 8-man group. New Clinic building with full facilities; modern hospitals; excellent school system including Wisconsin State University; pop. 34,000; early partnership if compatible. Write or call collect R. L. Larson, Mgr., Superior Clinic, Superior, Wisc. Phone 715-392-8111.

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WHOSE BLUES?

The average Participating Physician in Blue Shield who has entered practice in the past 15 or 20 years or less is often unaware of what an ally Blue Shield-Blue Cross has been to him and his medical brethren.

When physicians, unaware of the past, criticize Blue Shield, they do not realize that Blue Shield, over the years, has admirably served as medicine's bargaining table; that in many instances offers by commercial insurance companies have followed the schedules arrived at by Blue Shield, which schedules in turn were worked over and worked upon and worked out by members of the medical profession as Participating Physicians in such Plans. The criticism that Blue Shield is trying to dictate what the doctor's fee will be is utterly fallacious. Blue Shield acts as a sounding board for public opinion regarding physicians' fees and is cognizant of what the public is demanding in the way of medical coverage. By making these public demands known to the physicians and by working with boards of physicians, Blue Shield is constantly improving fee schedules in an effort to keep both physicians and the public happy in an ever expanding and complicated economy. It is not that Blue Shield is trying to fix fees but rather that the public is demanding such fixed fees, total medical coverage through insurance and other improvements in the manner in which health care costs can be met.

If the public wants and demands total prepayment of health care costs, it is of little avail for the medical profession to rail out against such an economic philosophy or to berate Blue Shield for attempting to come to grips with this problem. It does so by suggesting to physicians compromise plans, which, while answering in large measure the public demand, still preserve in the largest measure possible the free enterprise system of medicine.

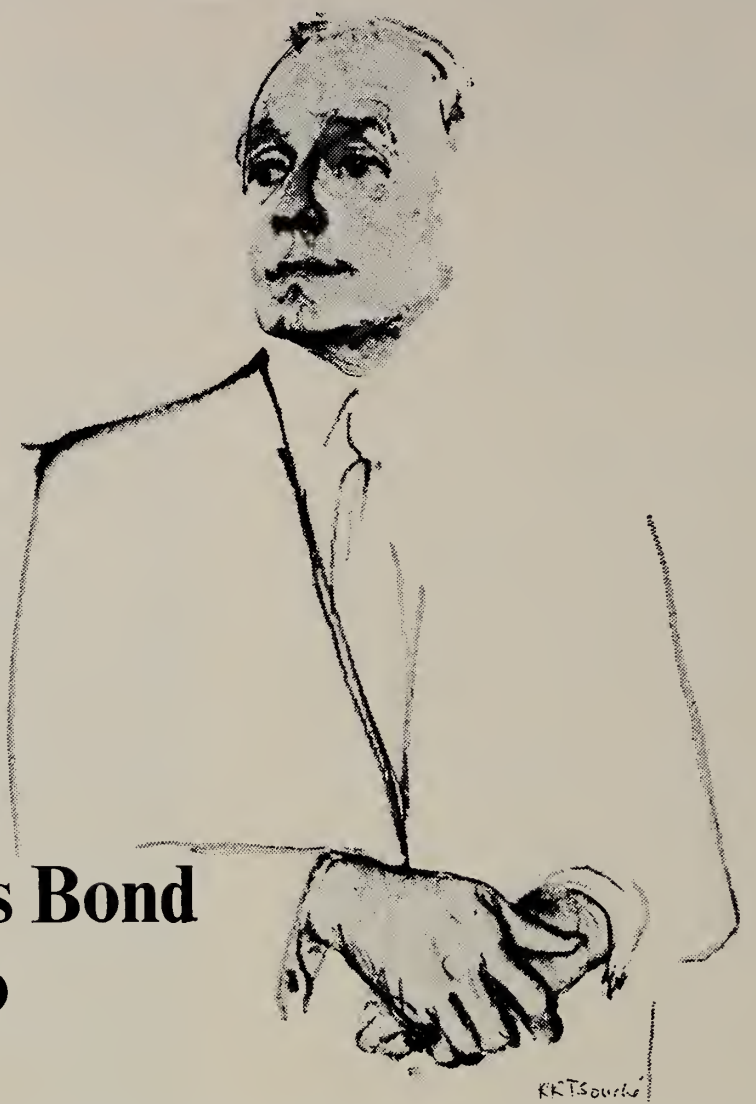
Raymond J. Fitzpatrick, M.D.
The Journal of the Florida
Medical Association

How to Disserve the Public

No one can deny that the provisions of the Federal Food, Drug and Cosmetic Act and its Amendments are in the public interest and promote drug safety to a degree not surpassed anywhere in the world. But it must be recognized — and this I cannot stress too strongly — that the provisions of these drastic and far reaching amendments should be administered in a scientific and flexible manner. An overly strict interpretation and application of the legal and regulatory language of the recent Amendments could stifle the development and production of new drugs. To regulate the production and use of drugs by responding to pressure groups and to the whim and fancy of biased and overly critical individuals whether lay or scientific, would be a disservice to the public. — Joseph F. Sadusk, Jr., M.D., to American College of Physicians, New York, April 19, 1966.

How to Beat the Antivivisectionists

When it comes to combating the tearful testimony of the various antivivisectionist groups we may be required to become just as emotional by using the testimony of grateful people who now live because of the contribution animals have made to medical knowledge. We must not be complacent. This is the year for the antivivisectionist — unless we combat emotions with truth. — Daniel B. Powell, M.D., in **Texas Medicine,** (62:27-28) February, 1966.



I bought my first Savings Bond 25 years ago

I was 14 years old

Mr. Jack Benny, distinguished star of the entertainment world, may not have a computer's memory when it comes to his age, but his dates are accurate about Savings Bonds.

The first Series E U. S. Savings Bond was issued 25 years ago on May 1, 1941, to President Franklin D. Roosevelt.

Mr. Benny was already famous as a radio comedian (the youngest in the business, by his own admission). And in the years which followed, he proved himself to be a good friend of the Bond Program, not only buying Bonds, but helping to sell them.

Through his efforts and those of countless other volunteers in radio and TV, stage and screen, and in all walks of life, the American people have bought more than $150 billion in Bonds.

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Pop's Proverb

Never worry about things you can't correct. Accept them — and apply yourself to things you can correct.

NEWS NOTES

The 44th Annual Session of the American Congress and American Academy of Physical Medicine and Rehabilitation will be held at the Sheraton-Palace Hotel, San Francisco, California, August 28 - September 2, 1966.

* * *

August 24-26, 1966 are the dates for the 13th Western Cardiac Conference to be held at the University of Colorado Medical Center in Denver, Colorado. The subject will be Ischemic Heart Disease. For further information, write: Colorado Heart Association, 1375 Delaware Street, Denver, Colorado 80204.

* * *

The Department of Pediatrics and The Office of Postgraduate Medical Education of the University of Colorado School of Medicine will conduct a course in Pediatrics at the Stanley Hotel, Estes Park, Colorado, August 1-5, 1966. The tuition fee for the five-day course is $80.00, and all who attend are required to register in advance. Address inquiries to The Office of Postgraduate Medical Education, University of Colorado School of Medicine, 4200 East Ninth Avenue, Denver, Colorado 80220.

* * *

Walter Kitzler, M.D., has left his practive in Webster, South Dakota, and has begun practice in Ipswich, South Dakota.

* * *

M. I. Sabbagh, M.D., McLaughlin, has been elected to active membership in the American Academy of General Practice.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

S. F. DOCTOR "CITIZEN OF WEEK"

Kendall R. Burns, M.D., was honored recently by the Sioux Falls Argus-Leader as the "Citizen of the Week." The honor was bestowed in recognition of Dr. Burns' efforts as a member of the National Council on Cancer.

Dr. Burns is chairman of the Postgraduate Medical Education Committee, Sioux Valley Hospital, and past president of the South Dakota Chapter, American College of Surgeons.

He has also served in various capacities in the Boy Scouts of America since 1954. At present he is assistant adviser for Explorer Post 23, committeeman of Troop 23 and a member of the Order of the Arrow.

* * *

DEATH CLAIMS
J. M. BUTLER, M.D.

John M. Butler, M.D., about 56, died unexpectedly in Hot Springs. Dr. Butler became ill while returning from the Country Club.

A physician for nearly a quarter of a century, he was head of the Butler Clinic and on the staff of the Lutheran Hospital. He is survived by the widow, a son and two daughters.

DEATH CLAIMS
JOSIAH K. LILLY

Josiah Kirby Lilly, chairman of the Board of Directors and former president of **Eli Lilly and Company,** died May 5th at his home in Indianapolis, Indiana. Mr. Lilly was seventy-two.

The pharmaceutical executive's personal philanthropy was marked in recent years by two particularly large gifts — the presentation of his rare book collection to Indiana University, Bloomington, and the donation of his 3,500-acre Eagle Creek Forest Reserve to Purdue University, Lafayette, Indiana.

Mr. Lilly is survived by a son, a daughter, his elder brother, six grandchildren, and one great-grandchild.

The residents of Wessington Springs, South Dakota, recently held a special recognition event for **Drs. T. B. McManus** and **Roscoe Dean** and their wives.

Doctors of the Homestake Hospital staff were among health personnel who were guests at the annual Strawberry Festival dinner in the Lead High School dining room recently. Recognition was given for the time the doctors spend helping to arrange and give physical examinations to the children attending the Lead Public Schools.

PRECEPTOR PROGRAM A SUCCESS

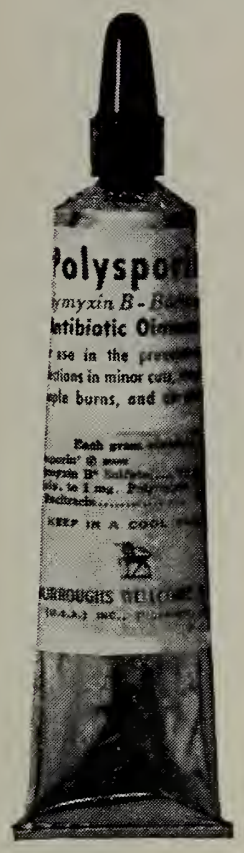
The preceptorship program conducted by the School of Medicine, University of South Dakota, during May, 1966 was again considered well done.

The following roster of preceptors and their assigned medical students will serve to inform the South Dakota physicians of the distribution of the students throughout the state, as well as to pay tribute to those participating physicians (and their associates or clinics as the case may be) who gave so generously of their time and efforts to make this teaching program a success:

CHRISTIE O. ADESANYA
Dr. Gerald Tracy, Watertown
HOLLIS L. AHRLIN, JR.
Dr. Harold Lowe, Mobridge
RICHARD E. BATTS
Dr. A. C. Vogele and Dr. C. L. Vogele, Aberdeen
CHARLES S. BONNEY
The Medical Clinic, Dr. Lyso, Yankton
PAUL BOOM
Dr. George Mangulis, Philip
LIONEL G. BROWN
Dr. Saxton, Huron Clinic, Huron
JAMES F. BURNS
Dr. Gordon Paulson, Rapid City
ARNOLD DELBRIDGE
Dr. E. A. Johnson, Milbank
BRUNO DE PALMA
Dr. E. T. Ruud, Rapid City
EDWARD L. EHRICHS
Dr. Frank Kalda, Platte
WILLIAM J. GALLAGHER
Drs. Nolan and Spiry, Mobridge
DAVID E. GAMBILL
Dr. David Buchanan, Huron
MARK C. HARLOW
Dr. Loren Amundson, Sioux Falls
DAVID L. HARRIS
Dr. Charles Roberts, Brookings
WILLIAM J. HOWARD
Dr. Melvin Marousek, Belle Fourche
JAY W. HUBNER
Dr. Buron Lindbloom, Pierre
DENNIS L. JOHNSON
Dr. Robert Fisk, Dell Rapids
HATIM KANAANEH
Drs. Perry and Sanders, Redfield
GARRON L. KLEPACH
Drs. Sundet and Swisher, Kadoka
TERRENCE J. KOLBECK
Dr. Jerry Walton, Martin
DENNIS B. KOTTKE
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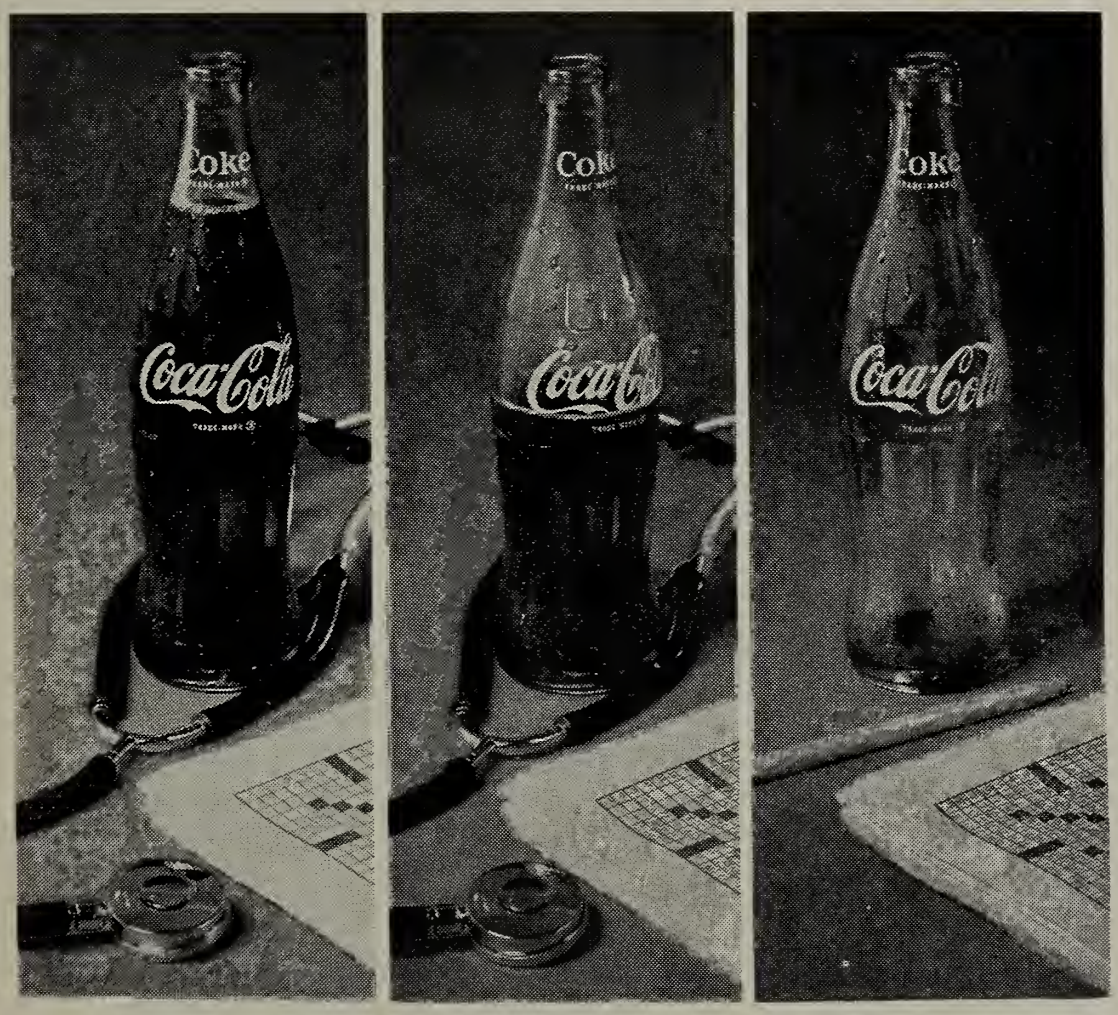


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E. Claiborne Robins (right), president of A. H. Robins, chats with **Dr. Alonzo P. Peeke** of Volga, South Dakota. Dr. Peeke was one of thirteen 1965 recipients of the Physician Award for outstanding community service who visited Richmond May 5-8 as guests of the company and Mr. Robins.

During their stay, the physicians were greeted at a breakfast by the Hon. Morrill M. Crowe, mayor of Richmond, toured A. H. Robins' manufacturing plant and research center and attended a reception and dinner.

CONGRATULATIONS ! ! ! !

Paul G. Bunker, M.D., Aberdeen, is the recipient of the Chevalier Jackson Award given by the American Broncho-Esophagological Association. The award is presented in recognition of outstanding service to broncho-esophagology.

FDA, AMA, PMA Calling All Physicians!

I have already begun to explore ways in which the Food and Drug Administration can keep the medical community — and I would include industry here as an equal partner — adequately informed of our deliberations and our actions. The FDA is late in this effort. Late, also, is the larger medical community, whose components — hospitals, clinics, dispensaries, infirmaries, doctors' offices, and medical schools — are still not in continuous, effective contact. This is not easy for me to say because, as a physician, I would hope that physicians would lead the way in this important venture. They and their patients would benefit most from an orderly information system within the medical community. — James L. Goddard, M.D., to American Society of Internal Medicine, New York, April 15, 1966.



S.D.S.M.A. SECRETARY HONORED

Mrs. Patty Butler, secretary to Richard Erickson, executive secretary of the South Dakota State Medical Association, was named "Secretary of the Week" recently. The honor was awarded at a banquet marking the observance of National Secretaries Day.

Mrs. Butler, whose name was submitted by Mr. Erickson, was chosen on the basis of her secretarial attributes. She was presented with a bouquet and trophy.

The Tentacles of Government Control

The new drug regulations were created because of certain problems which needed correcting. In an effort to be precise and encompassing, the wording was made all-inclusive. When interpretation and enforcement subsequently followed, it has been found now that not only was the total drug industry brought under complete government control, but also the whole of medicine. This means not only one phase of medicine, but the whole spirit of medicine has been made captive. — James H. Johnson, M.D., in **Annals of Allergy,** (24:88), February 1966.

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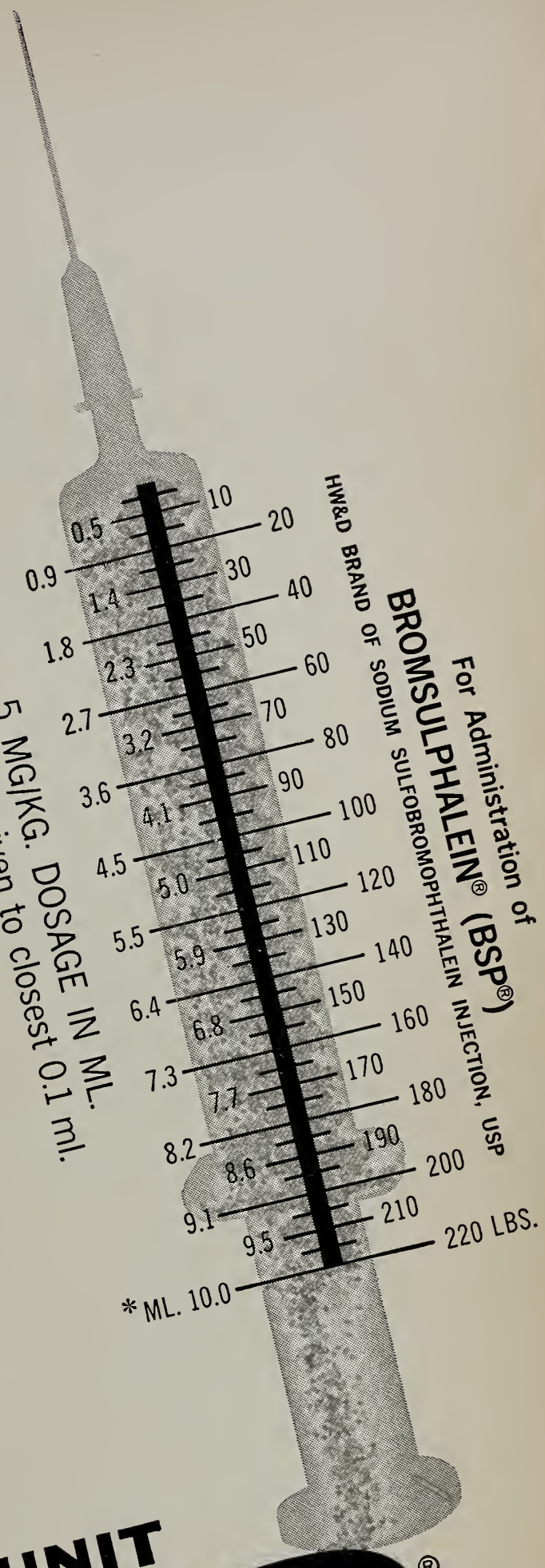
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Volume XIX **July, 1966** **Number 7**

CONTENTS

The Appearance of Carcinoma of the Lung in Pulmonary Tuberculosis Patients 13
Albert R. Allen, M.D., F.C.C.P.; Loxi Marian Allen, B.S.

Trends in Maternal Mortality in South Dakota: The Past Decade . . . 21
Report of Maternal Mortality Committee, South Dakota Society of Obstetrics and Gynecology, and the Division of Vital Statistics, South Dakota State Health Department

Operative Cholangiography 26
J. A. Muggly, M.D.

Editorial 31

President's Page 33

Letters 34

Deadwood Doctor 36
Frank S Howe, M.D.

This Is Your Medical Association 40

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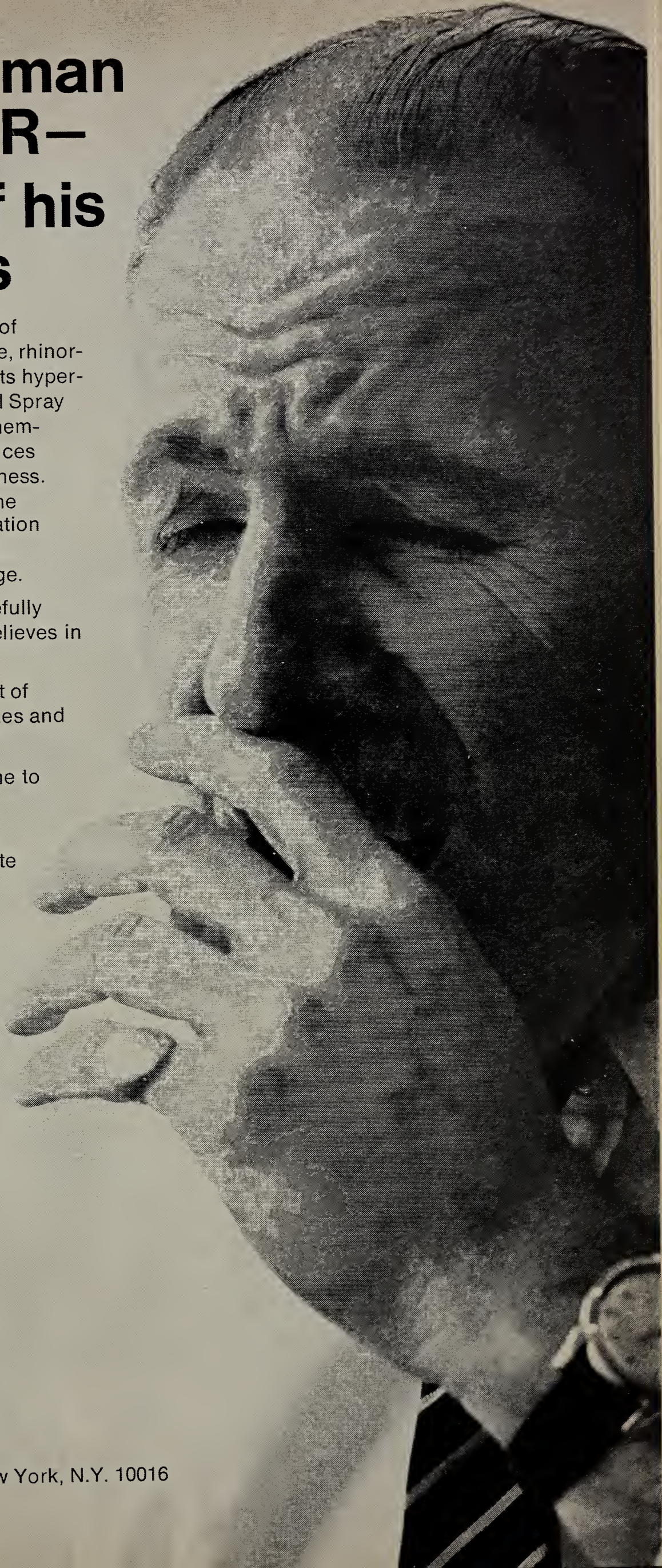
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THE APPEARANCE OF CARCINOMA OF THE LUNG IN PULMONARY TUBERCULOSIS PATIENTS

Albert R. Allen, M.D., F.C.C.P. and Loxi Marian Allen, B.S., Selah, Washington

This is a summary of the cases of carcinoma of the lung occurring among the cases of proven tuberculosis that were admitted to the Central Washington Tuberculosis Hospital from the time of opening, January 20, 1950 to the time it closed, December 31, 1957.[3] These cases have all been proved by the recovery of tubercle bacilli, using sputum and gastric culture methods.[4] When the hospital opened, all patients from the six county area that it served were transferred to it except for those too critically ill to move or those about to be discharged. In 1957 no new case was admitted during the last three months before closing. This summary was undertaken with two main objectives in mind: first, to learn how each year's new cases of tuberculosis compared in number, and second to place the cases of carcinoma in their chronological order. From 1952 on, all cases of proven tuberculosis received streptomycin, para-aminosalicylic acid and isoniazid continuously and concurrently plus early resectional surgery.[1, 2, 5] Early resectional surgery was performed for the following indications, (providing the candidate did not have complicating disease which would make resection impossible such as recent coronary artery occlusion, pulmonary insufficiency and so forth): 1. Those with positive cultures for tubercle bacilli after three months of combined drug therapy. 2. Disease which would probably reactivate such as bronchial stenosis, tuberculous bronchitis, bronchiectasis and caseous masses 2 cm. in size or larger and cavitary disease. 3. Reactivation following collapse therapy or combined drug therapy. 4. Previous history of irregular discharges such as in alcoholic patients. 5. Decortication after pleural effusion or previous pneumothorax to regain pulmonary function with resection of the diseased area of the lung. 6. Evidence of x-ray or clinical worsening that occurred in patients on combined drug therapy was most commonly associated with bronchogenic carcinoma and was found in two percent of the patients. The follow-up of these patients through the various Health Departments was done during the summers of 1964 and 1965 to see when those who were still alive were last followed and to check the death certificates of those deceased to learn the cause of death and if an autopsy had been performed.

Material and Method

Autopsies were performed on over 75% of all patients who died in the hospital. During the time the hospital was open there were eight cases of tuberculosis that developed carcinoma of the lung and another six patients developed it after discharge. The cause of death and whether or not an autopsy was done was taken from the death certificates and, if an autopsy was done, the results were obtained. Table I shows the number of tuberculous patients diagnosed each year, the average age, and the cases of carcinoma of the lung which appeared in the patients in chronological order according to the year the tuberculosis was diagnosed.

TABLE I

Year	1950	1951	1952	1953	1954	1955	1956	1957
No. Tuberculous Patients	150	102	110	123	144	95	117	78
Average age of Patients	39	40	37	40	37	42	41	41
Cases of Carcinoma	1	0	4	2	1	1	4	1

The following diagnostic points were used in searching for associated carcinoma of the lung in the presence of cultures positive for tubercle bacilli: 1. An atypical roentgenological appearance of a lesion for tuberculosis such as nodular density in the lower lobe, nodular density in the anterior segment of an upper lobe, segmental atelectasis, thick wall cavities with a ragged outline, and unilateral hilar enlargement.[24, 33] 2. Failure of the patient to improve, either on x-ray or clinically, after chemotherapy was started; or actual deterioration of the patient, particularly if the patient was forty or older.[16, 21, 25, 40, 43, 44] 3. Calcification within a nodule, which is usually tuberculosis but not always.[17] 4. Manifestations of inoperability such

as destruction of bone, elevation and paralysis of the diaphragm, paralysis of the vocal cords, pleural effusion containing tumor cells, etc.

CASE 1.

W. W. was a 69 year old white man admitted January 26, 1950 with far advanced active pulmonary tuberculosis, with positive sputum on smear and culture which remained so. Treatment consisted of streptomycin Gm. 1 IM every other day. He had a progressive downhill course and died February 15, 1951. Autopsy revealed primary squamous cell type bronchogenic carcinoma of the right lower lobe, pulmonary tuberculosis, and silicosis. The carcinoma was not suspected during life. This man had smoked one package of cigarettes daily for many years. Only the hilar enlargement that was present on the right from the time of admission to the hospital would make one suspicious of carcinoma. Evidence of pleural effusion was present on chest x-ray dated May 25, 1950, and atelectasis on the chest x-ray dated February 7, 1951. This patient remained too short of breath to be considered a surgical candidate.

CASE II.

R. H. was a 62 year old white man admitted January 29, 1952 with a diagnosis of pulmonary tuberculosis, moderately advanced and active with positive sputum cultures. All sputum specimens were negative after February 19, 1952 on both smear and culture. Sputum smear stained by Papanicolaou method showed atypical macrophage cells but no definite tumor cells. He had a progressive downhill course and died September 7, 1952. Autopsy revealed squamous cell carcinoma of the lung, and a relatively inactive focal fibrous tuberculosis of the lung. This case shows progression of disease with negative smears and cultures for tubercle bacilli in spite of continuous and concurrent drug therapy. He was a heavy smoker of cigarettes for many years until the year before admission to the hospital. In this case also there was suggestion of hilar enlargement on the right side. Between chest x-ray films of January 29 and April 17, 1952 there was decrease in the size of the right upper lobe. On July 10, 1952 the whole right lung field was obscured. Another unusual factor in the report on this case is that the pathologist considered the tuberculosis relatively inactive.

CASE III.

R. L. was a 53 year old white man admitted May 30, 1952 with pulmonary tuberculosis, moderately advanced. The diagnosis was established by a positive out-patient sputum culture. Posterior-anterior view of the chest dated June 2, 1952 and another dated July 2, 1952 showed some clearing of the disease in the left upper lobe. On the film dated November 3, 1952 there was increase in the amount of disease in the left upper lobe. So, in spite of the facts that he had continuous drug therapy, and that his cultures were negative, bronchoscopy was done on August 13, 1952. This produced evidence of moderate stricture of the right middle lobe bronchus but no evidence of tumor. Papanicolaou stain slides were questionable for tumor cells. A left pneumonectomy was done December 10, 1952. Pathologic diagnosis was bronchogenic carcinoma of the left lung, squamous cell type, secondary squamous cell carcinoma of the parabronchial nodes, purulent bronchitis and a chronic pneumonitis in the upper lobe with interstitial fibrosis and active caseous tuberculosis in the mediastinal nodes. He was discharged January 20, 1953 and died two years later from metastasis of the bronchogenic carcinoma. An autopsy was performed. This man had smoked a package of cigarettes daily for many years. It is interesting to note that there was very little residual tuberculosis in the pathology, not enough in the lung field itself to make a pathological diagnosis.

CASE IV.

J. F. was a 45 year old white man admitted October 23, 1952 with a diagnosis of silico-tuberculosis, with a positive sputum culture on October 24, 1952, a positive gastric culture on October 29, 1952, and a positive culture from the resected right upper lobe on June 9, 1953. All other gastric cultures were negative. P. A. chest x-ray showed infiltrative disease with cavitation in the right upper lobe and definite infiltrative disease in the left apex with dense caseous disease. Tomograph taken May 11, 1953 showed definite cavitation in the right upper lobe with narrowing of the apical segmental bronchus. Bronchoscopy done May 25, 1953 showed bronchitis involving the right main stem bronchus with some stenosis of the right upper lobe bronchus. On June 8, 1953, a right upper lobectomy with a four rib thoracoplasty was done and the pathological diagnosis was silico-tuberculosis with cavitation. He was discharged August 14, 1953, to continue streptomycin and isoniazid for three more months. He was re-admitted March 6, 1955 with a pleural effusion on the left. Pleural fluid on April 14, 1955 contained definite tumor cells. His cultures remained negative for tuberculosis. Death occurred on June 15, 1955.

Autopsy revealed a malignant tumor of the left pleura, with compression atelectasis of the left lung, left subapical caseous pulmonary tuberculosis, chronic rheumatic aortic endocarditis and valvulitis, and chronic peptic ulcer of the duodenum. Because no primary site could be found for the tumor the pathologist suggested the possibility that this might be a mesothelioma rather than a carcinoma. This patient had smoked two and a half packages of cigarettes a day for many years.

CASE V.

W. O. was a 70 year old white man admitted December 27, 1952 with pulmonary tuberculosis, far advanced, active, with positive sputum on smear and culture. It became negative from April 20, 1953 to the time of discharge on November 25, 1953. He also had diabetes mellitus and hypertensive heart disease with decompensation. His sputum was positive again on April 12, 1955 so he was re-admitted. The sputum smear and culture from February 27, 1956 to time of his death on April 25, 1956 were negative. P. A. and left lateral chest x-rays dated December 27, 1952 and March 11, 1953 show definite clearing. On April 11, 1955, there was a cavity in the left upper lobe with hilar enlargement on this side. On April 4, 1956, there was a mass in the left upper lobe with hilar enlargement, and the trachea moved to the left. At that time he also had an acute coronary occlusion and was markedly short of breath. Autopsy revealed squamous cell primary bronchogenic carcinoma of the left upper lobe, caseous pulmonary tuberculosis also on the left, bilateral pulmonary emphysema, hypertensive cardiovascular renal disease with hypertrophy of the heart and arteriosclerosis of the kidney, pancreas, and coronary arteries.

CASE VI.

A. P. was a 49 year old Indian woman admitted June 21, 1953 with a diagnosis of pulmonary tuberculosis, moderately advanced, with a positive gastric culture on June 23, 1953. She was started on routine antituberculous therapy and discharged on December 16, 1953. Gastric cultures dated March 23, 1955, May 9, and May 10, 1955 were positive, so she was readmitted. P. A. chest x-ray dated June 22, 1953 showed infiltrative disease in the left apex down to the second rib anteriorly, lying in the apical posterior segments. During her first hospitalization there was good clearing of the disease process leaving a tuberculoma type lesion. Because her cultures had become negative promptly with combined drug therapy and she had a fusion of the jaw from a fracture, resection was not attempted. On September 28, 1955 the apical posterior segment of the left upper lobe was removed. It required extraction of two teeth to make intubation possible. The pathological diagnosis was caseous pulmonary tuberculosis. She was discharged November 5, 1955 and continued anti-tuberculosis therapy until March 28, 1956. Because of pulmonary symptoms and a new lesion near the right hilus, she was admitted to Firland Sanitarium July 15, 1959. This lesion was followed by a pleural effusion on the right. Scalene lymph node biopsy was negative. Her sputum concentrates became positive. Bronchoscopy done January, 1960 revealed a grayish-white, necrotic growth on the anteriolateral wall of the right intermediate bronchus. Biopsy diagnosis was oat cell type carcinoma. She received deep x-ray therapy, and nitrogen mustards as palliative therapy. She died on September 11, 1960. Autopsy revealed that the right lung contained oat cell bronchogenic carcinoma with metastasis to the pancreas, both kidneys, left adrenal and to the skull. The left lung contained pathology typical of pulmonary tuberculosis. This patient was a heavy smoker for many years.

CASE VII.

B. M. was a 56 year old white male admitted September 20, 1953 with a diagnosis of pulmonary tuberculosis, moderately advanced and active, with a positive sputum and gastric culture on September 23, 1953. He was started on treatment and all subsequent cultures were negative. He was discharged March 18, 1954. P. A. chest x-ray dated September 21, 1953 showed a fine infiltration in both apices and A. P. tomographs showed a small cavity present in the apical segment of the left upper lobe with disease present in both the right and left upper lobes. He returned to Kentucky where he lived after discharge and was followed routinely until February, 1964, when he developed a cough. Chest x-rays were taken May 4, 1964 and showed a large mass in the right anterior hilar region about the size of a tennis ball and another golf ball sized mass in the posterior segment of the right upper lobe with enlargement of the hilus. Previous chest x-ray taken in August, 1962 was reported as "no change." Bronchoscopy done May 8, 1964 revealed a mass protruding from the lumen of the right upper lobe bronchus. Biopsy was taken and a diagnosis of squamous cell carcinoma, Grade II was established. Smears for tuberculosis were negative. The patient received x-ray therapy and died July 5, 1964. No

autopsy was performed. He had smoked one package of cigarettes daily for many years and two packs a day for the last two years.

CASE VIII.

H. D. was a 50 year old Negro man admitted November 1, 1954 with a diagnosis of pulmonary tuberculosis, moderately advanced and active, with a positive sputum culture November 2, 1954 and a positive gastric culture November 3, 1954. All cultures were negative from that time on. P. A. chest x-ray dated November 1, 1954 showed infiltrative disease in the right apex down to the third rib anteriorly. On the chest x-ray dated February 7, 1955 there was clearing of the lesion in the right apex but a new lesion was seen in the left second interspace. On June 17, 1955 this lesion on the left had increased in size with possible enlargement of the left hilus. Tomographs were suggestive of cavitation in the lesion in the anterior segment of the left upper lobe. Bronchoscopy on May 12, 1955 showed residual bronchitis in both the right and left upper lobes with no evidence of obstructive disease. Two Papanicolaou stained smears of bronchial aspiration revealed no tumor cells. On June 22, 1955 a left upper lobectomy and a five rib thoracoplasty was performed. Extensive hilar adenopathy was seen. A diagnosis of squamous cell carcinoma of the left upper lobe without involvement of the attached lymph nodes was made. He was discharged August 16, 1955 to continue streptomycin and isoniazid six months after resection. The last follow-up was January 17, 1957 when he was doing well, had negative cultures, and had no evidence of extension of the carcinoma. He had smoked cigarettes for 35 years. This case represents the appearance of a new lesion while receiving drug therapy and while the cultures were negative. This new lesion was in an atypical location for tuberculosis.

CASE IX.

C. F. was a 63 year old white man admitted June 19, 1955 with a diagnosis of pulmonary tuberculosis, moderately advanced and active, with positive gastric cultures June 22, 1955 and February 7, 1956. He had arteriosclerotic heart disease with auricular fibrillation. P. A. chest x-ray dated June 20, 1955 showed diffuse disease in both the right and left upper lobes. Scalene biopsy done October 20, 1955 was negative for carcinoma. He died April 11, 1956. At autopsy a primary bronchogenic carcinoma of the left lung and an anaplastic adenocarcinoma primary in the right upper lobe, secondary anaplastic adenocarcinoma of the tracheal, bronchial, and left hilar nodes and an implanted carcinoma of the left visceral pleura were found. There was also bronchiectasis with secondary anaplastic carcinoma of the right and left ureters, bilateral hydro-ureter and hydronephrosis and a bilateral chronic fibrous pleuritis. The lung tissue not involved by tumor showed no evidence of granulomatous or tuberculous tissue of characteristic morphology. This man had smoked one package of cigarettes daily for at least 35 years.

CASE X.

J. E. F. was a 67 year old white man admitted January 14, 1956 with a diagnosis of pulmonary tuberculosis, far advanced, with positive sputum on smear and culture January 16, 1956 continuing positive to April 17, 1956 when they became negative. P. A. chest x-ray dated January 16, 1956 showed infiltrative disease in the right apex with cavitation in the right apex in the anterior segment of the right upper lobe. On April 19, 1956 the cavity was much larger, with a definite fluid level. Bronchoscopy done May 25, 1956 revealed marked distortion of the right main-stem bronchus with granulation tissue which bled freely when touched. The biopsy report was squamous cell carcinoma of the bronchus. On July 2, 1956 a thoracotomy was done which revealed invasive carcinoma of the superior vena cava, pulmonary artery, superior pulmonary vein and chest wall beyond resection. He died July 12, 1956. At autopsy only primary squamous cell carcinoma of the right upper lobe bronchus was found with metastasis to the liver and a lung abscess of the right upper lobe. The pathologist commented: "It remains a mystery to me how an individual such as this could have repeated positive sputum or acid fast bacilli and still show no morphological or bacteriological evidence of tuberculosis in the lung and the lymph nodes." This patient is the only one with bronchogenic carcinoma who did not admit smoking at the time he was admitted to the hospital.

CASE XI.

B. B. was a 51 year old white female admitted June 7, 1956 with a diagnosis of pleurisy with effusion. A gastric culture June 12, 1956 was positive for tubercle bacilli. A right thoracentesis done June 18, 1956 was negative on smear and culture for tubercle bacilli but Papanicolaou smear revealed the presence of tumor cells. An open pleural biopsy was reported as metastatic adenocarcinoma. She was discharged June 29,

1956 and died in January, 1958. No autopsy was performed.

CASE XII.

E. L. was a 76 year old white female first admitted September 26, 1956, discharged November 14, 1956; readmitted June 21, 1957 with a diagnosis of pulmonary tuberculosis moderately advanced with one positive sputum culture August 13, 1957. Because of this she was started on antituberculous therapy and all other cultures were negative. P. A. and right lateral chest x-rays dated September 7, 1957 showed progressive enlargement of the lesion off the right hilus in the right middle lobe in spite of the antituberculous therapy. She was bronchoscoped September 29, 1956 and this was negative except for displacement of the corina to the left. She was bronchoscoped August 9, 1957 and no new growth was found. Because her cultures were negative, she was discharged November 25, 1957. She died June 16, 1958 about three weeks after pathological fracture of her hip. No autopsy was done. This patient also was a non-smoker, and the only one on which no pathology is available.

CASE XIII.

R. G. was a 56 year old white man admitted November 11, 1956 with a diagnosis of pulmonary tuberculosis moderately advanced and active with one positive sputum culture November 12, 1956. All other cultures were negative. P. A. and left lateral chest x-rays dated November 12, 1956 showed infiltration in the apical posterior segment of the left upper lobe. He was discharged February 11, 1957 and continued streptomycin and isoniazid until November 15, 1957. He had excellent clearing of the infiltrative process. A routine follow-up film dated February 25, 1963 showed changes under the left third rib with prominence of the left hilus. A definite circumscribed lesion appeared here and continued to progress slowly. Because of the marked pulmonary emphysema with continuous cyanosis, tachycardia and polycythemia, any surgical consideration was impossible. Sputum smears for tumor cells and for tubercle bacilli were consistently negative. He developed Jacksonian type epilepsy and blindness, and died January 17, 1965. Autopsy revealed bronchogenic carcinoma, squamous cell type, with metastasis to the brain and marked pulmonary emphysema. In the center of the primary bronchogenic carcinoma was a calcified granuloma. The evidence of calcification is seen on the tomograph but the location of this mass was in the anterior segment. This patient was a heavy smoker for many years. Theoretically, the presence of calcification in the nodule is supposed to indicate tuberculosis.[17, 18]

CASE XIV.

H. T. was a 63 year old white man admitted February 5, 1957 with moderately advanced pulmonary tuberculosis, with a positive sputum culture February 6, 1957. All other sputum and gastric cultures were negative. In spite of treatment, he had a rapid downhill course and died May 10, 1957. Autopsy revealed bilateral diffuse fibrous pneumonia with multiple cyst formation, primary peripheral adenocarcinoma of the left upper lobe, primary oat cell carcinoma of the right upper lobe with extensive metastasis to the broncho-mediastinal nodes, cor pulmonale, fibrosis and calcification of the spleen, liver and adrenal glands with morphologic characteristics of tuberculosis. This man's chest x-rays showed a typical lymphogitic spread of carcinoma without pathological changes consistent with pulmonary tuberculosis to explain the positive culture. He was also a heavy smoker of cigarettes for many years.

DISCUSSION

Graham[22] reported that tuberculosis is infrequently accompanied by primary carcinoma of the lung. Carey and Greer[15] found only 80 cases of carcinoma of the lung in tuberculosis patients before 1932, but there were 140 cases from 1932 to 1957 in the English literature alone. An incidence of 1.4% is reported by Hamel et al,[23] Robins and Silverman,[36] and Nuessle.[30] Campbell and Hughes[14] found carcinoma of the lung twenty times more frequent in the tuberculous patient than in the general population. This increase in incidence has been attributed to the theory that tuberculous patients are now older. Table I. shows that the average age of the tuberculous patients in this group being reported did **not** change greatly, but from 1952 on the incidence of carcinoma of the lung increased markedly to 2%. Campbell and Hughes[14] reported the youngest case, age 31 years; Bender[10] reported a case 43 years of age.

Reider and Farber[32] reported on the changing patterns in chest disease using adult deaths as a means of measure. Covering a twenty year period (1942-1962), they selected the first, ninth and twentieth years as samples. The average age of the patients who died increased. They found that although mortality rates from tuberculosis in the community, as well as at the hospital, showed a steady decline, the dramatic

predominance of non-tuberculous deaths among hospitalized patients **did not** appear until several years after isoniazid had been in general use. They report that carcinoma of the lung showed a startling rise as a cause of death during the most recent decade, an increase of seven and one half times over the percentage for the year 1950-51. During the same period the San Francisco Department of Public Health reported a rise of only 54% for the general public.

While treating these patients I felt that isoniazid was carcinogenic, but that does not seem to be the case. In animal experiments done by Pansa and Bikfalvi,[31] isoniazid produced bronchial hyperplasia, but isoniazid was felt to be non-carcinogenic by Viallier and Casanova.[42] The increased incidence of carcinoma of the lung in this group of tuberculous patients began in 1952 when isoniazid was first used. Rigler[34, 35] reported that a great many carcinomas of the lung grow slowly over a period of years before producing symptoms or signs. In these fourteen cases, all but five had carcinoma when first admitted to the hospital, and it is possible that the carcinoma could have been a factor in the recovery of tubercle bacilli. I do feel, however, that isoniazid increases the rate of growth of carcinoma of the lung so that it becomes apparent shortly after treatment for tuberculosis is started. If this is true, then the carcinoma that was present, but not visible, suddenly starts to grow and becomes obvious while receiving isoniazid as part of antituberculous therapy.

Drymalski and Sweany[19] found fifteen cases of bronchogenic carcinoma associated with acid fast organisms in their sputum on smear or culture before death in two thousand consecutive autopsies in a tuberculosis hospital. Five of these cases had far advanced pulmonary tuberculosis, three cases were arrested pulmonary tuberculosis and in seven cases definite tuberculous lesions could not be found. Schwartz and Gluck[37] reported a case that had tubercle bacilli in the sputum before death, yet the pathologist could find no tissue with morphological characteristics typical of tuberculosis. Allen et al[4] found that the presence of positive cultures could not be explained by the pathologist in about 15% of cases. Why, then, is a diagnosis of non-tuberculous disease made in these patients, in the face of clinically active tuberculosis with one or more positive cultures? There are two possible answers: first, as Medlar[26, 27] suggested, the pathologist may see these lesions early in the evolution of typical tubercle formation, before the classic picture develops: and second, the pathology of tuberculosis is altered by combined drug therapy.

The diagnostic accuracy of the usual simpler procedures which are used to establish the diagnosis of carcinoma of the lung are much less accurate in these patients who have tuberculosis.[14, 23] For example, Papanicolaou stained smears of sputum or bronchial aspirated material were done on four patients and all were negative. Eight bronchoscopies were done on seven patients and in only three could a biopsy be made which established the diagnosis of carcinoma of the lung. In two cases, the resected specimen was required to establish the diagnosis, and in four the diagnosis was not established until autopsy.

None of these patients died of pulmonary tuberculosis, and only three were still positive for tubercle bacilli at the time of death. In the two resected specimens, a diagnosis of pulmonary tuberculosis could not be made by the pathologist, and in four other cases at autopsy, characteristic morphology of tuberculosis could not be found in the lungs. One case was called granuloma with central calcification.

Another factor in the increased incidence of the two diseases is the fact that almost all of the patients in each series of cases were moderate-to-heavy smokers of cigarettes. Auerbach et al[6, 7, 8, 9] pointed out the changes seen in the lungs of cigarette smokers. Somewhat similar changes have been reported by Berkheiser[11] in tuberculous patients. Others who have stressed the possibility that previous pulmonary tuberculosis may be related to later carcinoma of the lung are Schwartz,[38, 39] Woodruff et al,[45, 46] Meyer et al,[28] Mody and Poole,[29] Fried,[20] etc.

Boucot et al[12, 13] in their study stated that more than half of the men that they followed who developed lung cancer had roentgenological abnormalities due to non-malignant conditions before the first signs of the neoplasm. The most common of these was pulmonary fibrosis either localized or generalized. These findings are compatible with the concept of scar cancer as suggested by Yokoo and Suchow.[47] In the fourteen cases reported here, two had silicosis and a third had diffuse fibrosis.

Carcinoma of other types causing death during hospitalization were melanoma, Carcinoma of the stomach, Carcinoma of the liver, auditory neuroma and one primary site unknown. Autopsies were done on 10 of 11 patients who died of carcinoma during hospitalization. Two cases of carcinoma of the larynx were diagnosed in the

hospital. One died with an acute coronary occlusion the day before laryngectomy, and the other died of carcinoma of the larynx six months after discharge.

Of the patients receiving isoniazid, there have only been three carcinomas other than those of the lung reported as causes of death since discharge from the hospital: one of the stomach within one year of discharge, one of the pancreas six years after discharge and one of the ovary eight years after drug therapy was stopped. It seems, therefore, that while carcinoma was a common cause of death in the hospital, it has not continued to be a common cause of death after discharge. Why didn't carcinoma continue to be a major cause of death in the discharged patients as it was while they received drug therapy?

CONCLUSIONS

1. The number of new cases of tuberculosis admitted to the Central Washington Tuberculosis Hospital yearly from 1950-1957 did not change appreciably.

2. Cultures positive for tubercle bacilli do not rule out the possibility of carcinoma of the lung.

3. Carcinoma of the lung should be considered in all pulmonary tuberculosis patients when there is progression of the disease on x-ray or clinical deterioration while the patient is receiving anti-tuberculous therapy.

4. The diagnostic tools used in establishing a diagnosis of carcinoma of the lung (serial x-rays, bronchoscopy, Papanicolaou stain of bronchial secretions, etc.) are less accurate in these patients who have pulmonary tuberculosis as well.

5. The average age of the tuberculous patients in this group did not change greatly, but from 1952 on the incidence of carcinoma of the lung increased to 2%.

6. All but one of these patients with bronchogenic carcinoma were moderate to heavy smokers of cigarettes for many years.

7. Three of these patients had pulmonary fibrosis from disease other than tuberculosis, two had silicosis.

8. Thirteen of these fourteen patients are known dead. None of them died of tuberculosis and only three were still positive at the time of death.

9. The pathologists were unable to make a diagnosis of pulmonary tuberculosis from two resected specimens and from four at the autopsies.

10. This group contained four unusual cases: two patients had adeno-carcinoma in one lung and bronchogenic carcinoma in the other; one patient had a possible mesothelioma since no primary carcinoma could be found; and another patient had evidence of calcification in a nodule of the lung on tomography. This is supposed to indicate a benign lesion but was found to be calcification in a granuloma in the center of a bronchogenic carcinoma at autopsy.

11. It seems to me, therefore, that isoniazid is the main factor in the increased incidence of bronchogenic carcinoma in patients with pulmonary tuberculosis.

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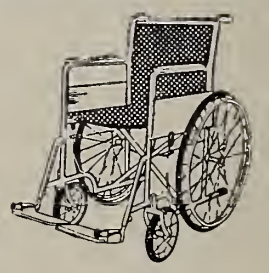
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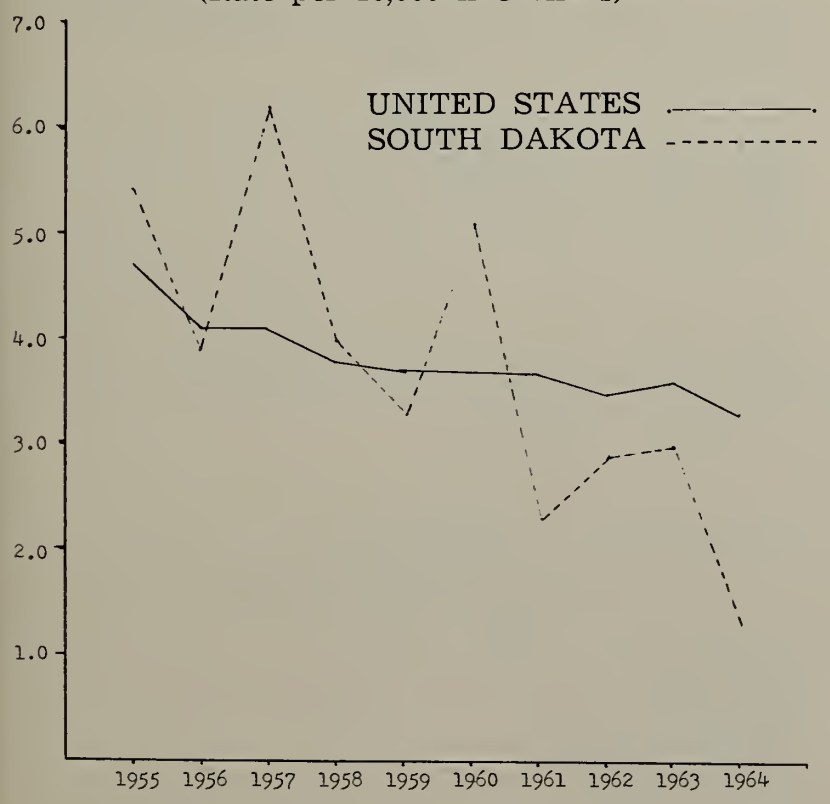
TRENDS IN MATERNAL MORTALITY IN SOUTH DAKOTA: THE PAST DECADE

**Report of the Maternal Mortality Committee
South Dakota Society of Obstetrics and
Gynecology and the Division of Vital
Statistics, South Dakota State Health
Department**

From 1955 to 1965 there were 66 maternal deaths in the State of South Dakota. Obstetrical complications accounted for 42 deaths, while 21 were due to pre-existing disease or conditions not directly related to the pregnancy. Two deaths were considered non-obstetrical, since they were not related to pregnancy or its management.

In the decade 1955 - 1965 the national maternal mortality rate varied from a high of 4.7 per 10,000 live births in 1955 to a low of 3.4 in 1964. In the same period the rate in South Dakota ranged from 6.2 in 1957 to 1.3 in 1964. This variation reflects the smaller number of deaths in this state and hence a greater instability in the annual rates. The ten year death rate for South Dakota (1955-1965) is 3.74 which is somewhat lower than the 3.83 rate for the United States for this same period. The comparison of the maternal mortality rate in South Dakota and that in the United States for the past ten years can be seen in Chart I.

CHART I
MATERNAL DEATH RATES
UNITED STATES - SOUTH DAKOTA, 1955-1965
(Rate per 10,000 live births)



CAUSES OF DEATH

Acute blood loss or complications as a result of hemorrhage remains the leading cause of maternal mortality in South Dakota and accounts for 24 deaths, or more than one half of all maternal deaths due to direct obstetrical factors (42), and somewhat less than 1/3 of all maternal deaths. Cardiovascular disease, which includes pre-existing disease as well; as embolic accidents is the second leading cause of death, accounting for somewhat more than one quarter of all deaths. Toxemia (eclampsia) and sepsis together account for one sixth of the total deaths, while the remaining 12 deaths are divided among several miscellaneous causes, as seen in Table I.

TABLE I
CAUSES OF MATERNAL DEATH IN SOUTH DAKOTA (1955-1965)

Hemorrhage		24
Cardiovascular		19
Infection		6
Toxemia		4
Carcinoma		5
Colon	1	
Ovary	1	
Choriocarcinoma	3	
Peritonitis secondary to ruptured appendix		1
Meningitis		1
Pneumonia, lobar		1
Intestinal obstruction		1
Not classified		2

Ruptured uterus accounted for 1/3 of maternal deaths due to acute blood loss. Five deaths from hemorrhage were classified as post-partum, while three were secondary to ruptured ectopic pregnancies. Eight deaths were associated with placental accidents or placental retention. Table II gives the direct cause of the maternal deaths from hemorrhage. A clinical diagnosis of afibrogenimia was made in eight of the deaths from blood loss.

Embolism, either thrombic or amnionic fluid, accounted for over one half of the deaths from cardiovascular causes. There were two deaths from right (congestive) heart failure, and two from left heart failure (pulmonary edema). At least two of these deaths were associated with

a myocarditis, while the etiology in the others remains obscure. Two deaths were associated with the sudden development of cardiac arrhythmias following the use of trilene for anesthesia. The causes of deaths which involve the cardiovascular system are seen in Table III.

TABLE II
HEMORRHAGE AS A CAUSE OF MATERNAL DEATH

Ruptured uterus		8
Post-partum hemorrhage		5
Ruptured ectopic		3
Placenta		8
Retained	2	
Abruptio	4	
Previae	2	

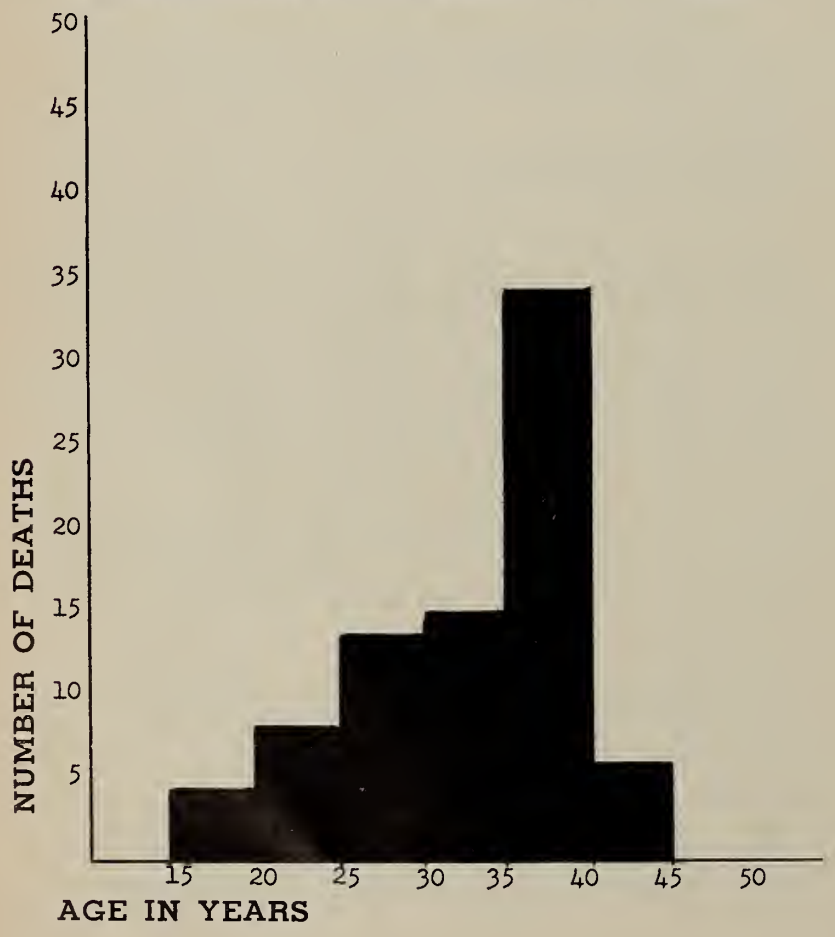
TABLE III
CARDIOVASCULAR CAUSES OF MATERNAL DEATH

Pulmonary embolism	6
Amnionic fluid embolism	3
Right heart failure	2
Left heart failure	2
Arrhythmias, cardiac	2
Cerebral-vascular accident	1
Coronary occlusion	1
Aneurism, Subclavian	1
Thrombosis, mesenteric	1

Of the six maternal deaths due to infectious processes only three were due to septicemia secondary to obstetrical causes. One followed a Caesarean section, and one an abortion, while the exact cause of the third was unknown.

Of the four deaths due to toxemia, two were associated with eclampsia, one with acute renal failure, and one with hepatic failure.

MATERNAL DEATHS RELATIVE TO AGE



RACE, AGE, AND PARITY

Non-causasian deaths account for six of the sixty-six maternal deaths, all of which were among the Indian population of the State. The age distribution in maternal deaths is seen in Chart II. The decade 30 to 40 years accounts for more maternal deaths than any other age group, with a peak incidence at age 35 to 40 years.

Of the 56 deaths where gestational age was known at the time of maternal death, 33 were 38 weeks or later (term). Only one death was known to have occurred in the first trimester of pregnancy. Seven deaths occurred in the second trimester (12-24 weeks).

The peak parity for maternal deaths appears to be Para 3 with eleven deaths. Six deaths occurred in primapara. Chart III shows the relationship of parity to maternal death.

MATERNAL DEATHS RELATIVE TO PARITY



TYPE OF DELIVERY AND CAESAREAN SECTION

The type of delivery was noted in only 39 of the maternal deaths. Twenty deliveries were spontaneous and seven operative exclusive of Caesarean Section. Version and extraction was done in three of the seven operative deliveries. There were ten deaths following or during Caesarean Sections. The causes of these deaths are seen in Table IV.

TABLE IV
CAUSES OF MATERNAL DEATH FOLLOWING CAESAREAN SECTION

Toxemia (eclampsia)	2
Infection	2
Hemorrhage	3
Embolism A.F.	1
Choriocarcinoma	1
Not classified	1

PLACE OF RESIDENCE AND PLACE OF DEATH

In six deaths the maternal residence at the time of death was not in the state of South Dakota. Twenty-five mothers did not live in the county in which death occurred, and two did not die in the place where delivery occurred. In reviewing the 25 deaths where delivery and residence were not in the same county, it appears that nine deaths were related to the problem of transportation and/or prompt blood replacement.

CONCLUSIONS

Acute blood loss from obstetrical complications remains the leading cause of death of maternal patients in South Dakota and suggests that prompt blood replacement remains a problem in the state. Cardio-vascular disease including embolic phenomena and acute heart failure has shown a marked increase as a cause of maternal death.

The high incidence of Caesarean section (15%) in these maternal deaths tends to show that the combination of surgery with hemorrhagic shock or eclampsia is lethal.

Digitalis — Would FDA Approve It Today?

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atropine sulfate . . . . . 0.025 mg.



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- **Malabsorption syndrome**
- **Ileostomy**
- **Gastroenteritis and colitis**

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Children: 3 to 6 months — 3 mg. (½ tsp.* t.i.d.)
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1 to 2 years — 5 mg. (½ tsp. 5 times daily)
2 to 5 years — 6 mg. (1 tsp. t.i.d.)
5 to 8 years — 8 mg. (1 tsp. q.i.d.)
8 to 12 years —10 mg. (1 tsp. 5 times daily)

Adults: 20 mg. (2 tsp. 5 times daily or 2 tablets 4 times daily)

*Based on 4 cc. per teaspoonful.

Maintenance dosage may be as low as one-fourth the therapeutic dose.

Precautions: Lomotil, brand of diphenoxylate hydrochloride with atropine sulfate, is a Federally exempt narcotic preparation of very low addictive potential. Recommended dosages should not be exceeded. Lomotil should be used with caution in patients with impaired liver function and in patients taking addicting drugs or barbiturates. The subtherapeutic amount of atropine is added to discourage deliberate overdosage.

Side Effects: Side effects are relatively uncommon but among those reported are gastrointestinal irritation, sedation, dizziness, cutaneous manifestations, restlessness, insomnia, numbness of extremities, headache, blurring of vision, swelling of the gums, euphoria, depression and general malaise.

SEARLE *Research in the Service of Medicine*

OPERATIVE CHOLANGIOGRAPHY

By
J. A. Muggly, M.D.
Madison, South Dakota

I would like to discuss a controversial topic, that is, operative cholangiography both precholedochotomy and postcholedochotomy. I will try to relate some of my experiences with cholangiography. In reviewing 107 cholecystectomies that I have done in the past few years, 58% have had a cholangiography.

Cholangiography began in 1918 with the introduction of barium paste into a biliary fistula. Certainly many improvements have been made since then and various techniques have evolved. Cholangiography can bring to light much valuable information about unsuspected lesions such as small calculi, strictures and tumors; and in postcholedochotomy cholangiograms, overlooked stones may be found. However, the value of the procedure is only as good as the cholangiograms obtained. Poor roentgenograms give poor, and often, false impressions. I feel, for the time involved doing the procedure, that it pays big dividends in finding unsuspected pathology in some and in preventing duct exploration in others. I am sure we all use just a little different technique but, whatever it is, as long as good results are obtained it meets the need.

I have tried several methods in doing precholedochotomy cholangiograms and at the present I use two different techniques: one using a polyethylene tube, and the other using a long needle and injecting the duct directly. The first step in the technique is that all my cholecystectomy patients are intubated so that respiration can be controlled during the time of taking the x-ray pictures. I have a double top on our table so that I can insert a grid and cassette between the two table tops. The patient is positioned on the table and scout films are taken prior to the abdominal preparation to make sure our position is satisfactory. The patient is usually tilted a little to the right so the spine is out of the way of the distal end of the common duct. I usually operate through a right subcostal incision and after the abdominal exploration, I proceed to identify the cystic duct, the common duct, and the cystic artery. I prefer to ligate the cystic artery if possible. I then pass two ligatures around the cystic duct, ligating the proximal one, and then partially transect the cystic duct. Following this, I introduce the small polyethylene tube which is filled with dye and attached to a syringe so that I get no air in the tube or the duct. The previously placed ligatures are tied around the polyethylene tube to hold it in position. I have used various dyes in doing this procedure but at the present time I am using Hypaque, 50%; I had used 30% for a time but I feel I have obtained better pictures with 50% and have not noted any reaction to the dye. I next inject 5 to 7 cc. depending on the size of the duct, if large I use even more, and



Figure 1.

Presented at the Annual Meeting of the South Dakota Chapter of the American College of Surgeons, Huron, S. Dak., Jan. 8, 1966.

take the first film. I inject another 7 cc. and take the second film. While these films are being developed, I remove the tube, ligate the cystic duct and remove the gallbladder. (Fig. ♯1)

In using a needle to do the precholedochotomy cholangiograms, I ligate the cystic duct and then use the regular local tonsil needle and insert this into the common duct, inject dye, and take pictures in the same fashion as if I were using a catheter. (Fig. ♯2)



Figure 2.

I estimate that either procedure increases my operating time about ten minutes but I feel it is time well spent.

The criteria for operative cholangiography might be considered in two aspects: one, the indications; and two, the presence of contra-indications. The indications are about the same as for exploring the common duct, at least a suspicion that a stone or some lesion is present. I will briefly review some indications for exploring the common duct: (1) a palpable stone in the common duct, (2) history of jaundice preceded by or associated with pain or intermittent elevation of temperature, (3) thickened common duct wall, (4) an increased diameter of the common duct, (5) contracted gallbladder containing stones, (6) a dilated cystic duct, (7) enlargement of the head of the pancreas, (8) presence of more than one calculus in the gallbladder of a patient



Figure 3.

This reveals a stone remaining at the distal end of the common bile duct and, because of the patient's poor pulmonary and cardiac condition, the above procedure was carried out.

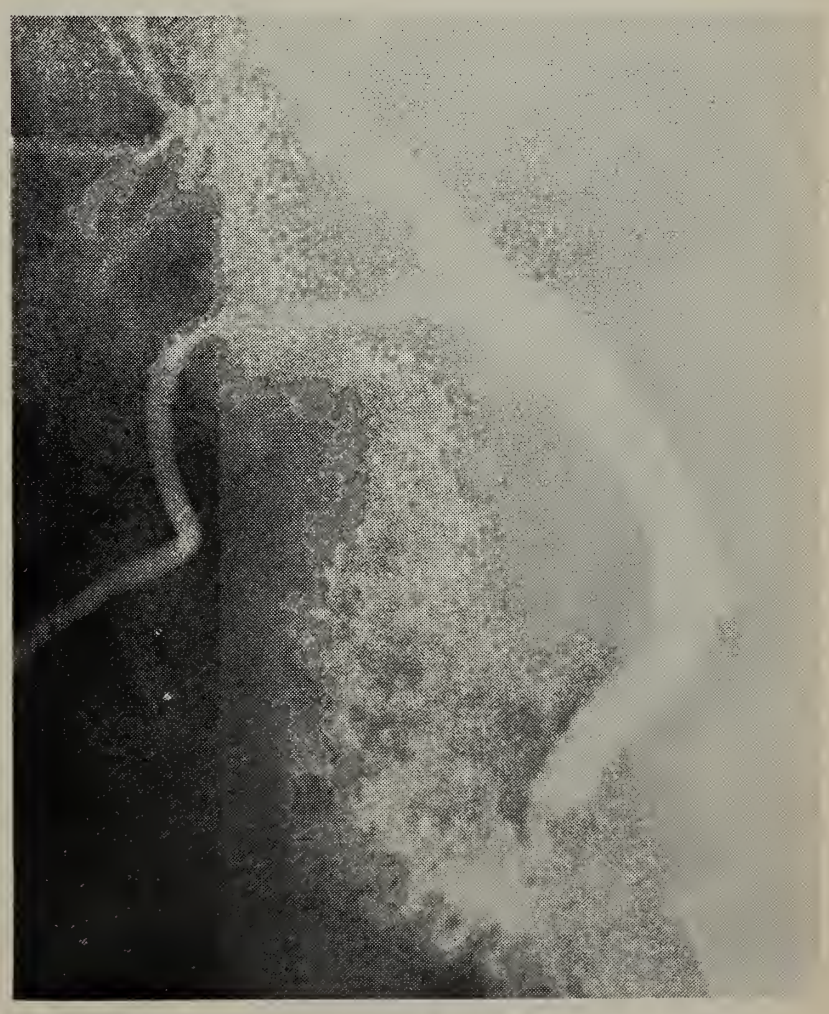


Figure 4.

This shows the cholangiogram after having received the so-called "flush treatment."

UNIVERSITY OF MARYLAND



Figure 5.
Very frequently small stones are easily overlooked and on this plate, one notes a small stone at the distal end of the common duct. This stone could not be palpated, the duct itself did not seem to be enlarged but, with much difficulty, I was able to remove a small stone.



Figure 6.
Postcholedochotomy film showing the stone removed.



Figure 7.
This shows a defect at the distal common duct and yet this stone was not palpable as it was made up mainly of a soft type of bile.

over 65 years of age, (9) the secondary operation for an overlooked stone or a newly formed stone — sometimes one may find defects in the intrahepatic duct, (10) the presence of occult blood in the stool that is unaccounted for in patients with biliary disease — these patients may have a duct cell carcinoma.

The contra-indications are those people who have iodine sensitivities, those patients in whom added surgery and time would add too greatly to the risk, and in some cases of cholangitis.

I am sure you have all found greatly dilated common bile ducts, and on palpation could not feel a stone. Then, on opening the duct, you found no stones. A precholedochotomy cholangiogram would certainly be very helpful in arriving at a correct diagnosis.

I also feel that postcholedochotomy cholangiograms are equally as helpful as precholedochotomy cholangiograms. I am sure that many of you have been embarrassed in the past, when doing a postoperative cholangiogram a few days after surgery, to find a stone remaining. If, however, a postcholedochotomy operative cholangiogram had been done, the calculus most likely would have been found and a second operation prevented. Perhaps, you have been unfortunate

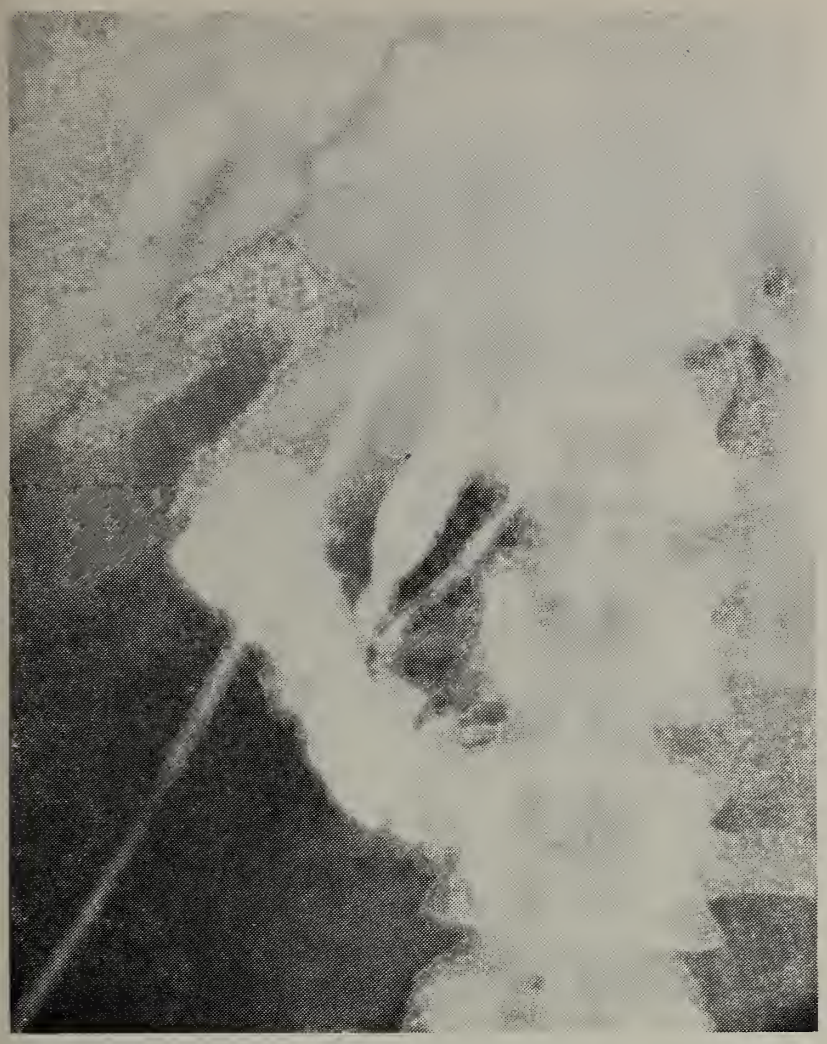


Figure 8.
Postcholedochotomy film.



Figure 9.
At times I have found considerable spasm of the duct in doing cholangiograms and this plate shows a spasm present. I felt definitely that there were no stones present as I was able to pass dilators into the duodenum without difficulty after having removed several stones.



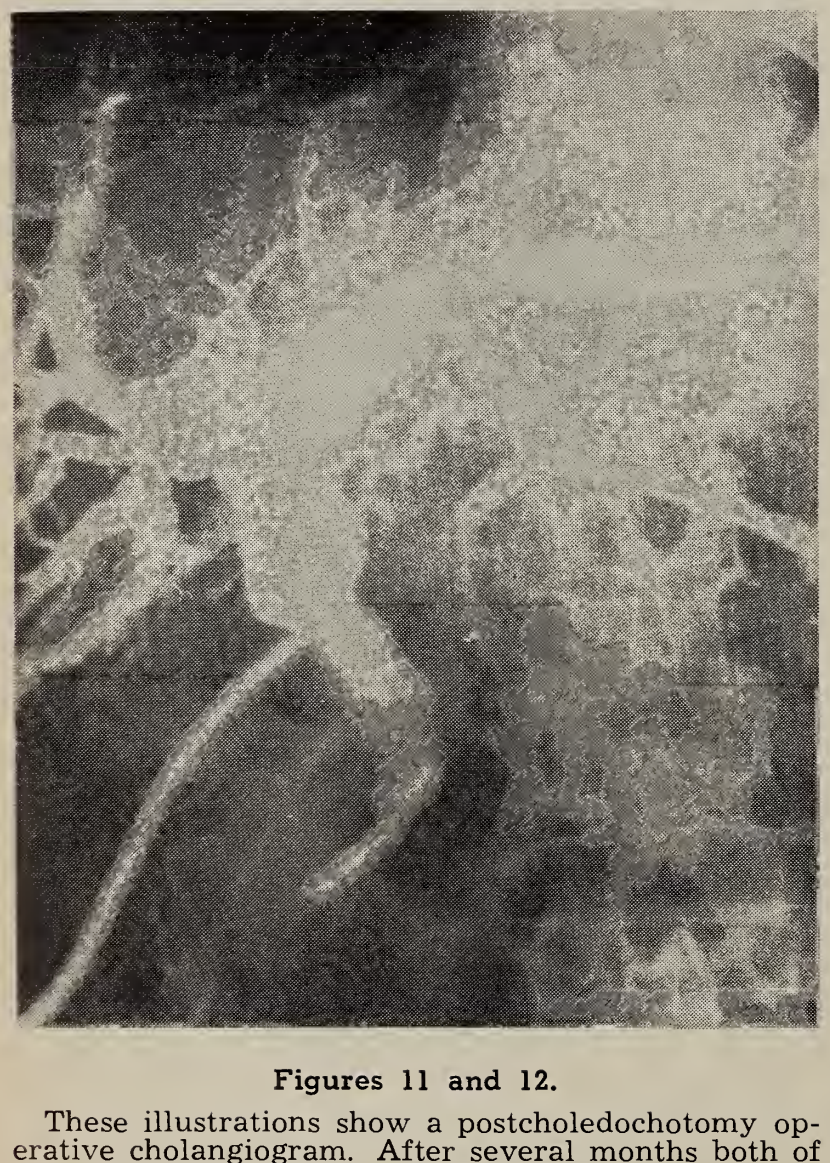
Figure 10.
This was taken after Nitroglycerine had been given the above patient (Fig. 9) and the dye readily entered the duodenum.

The problem of narrowing and stricturing of the distal duct has been a confusing one to me. I have not been able to establish any definite criteria in determining which of these patients might need secondary operations.

enough to have left a stone behind — which I have. Because of the patient's condition, I elected to dissolve the stones during the so-called "biliary flush," as recommended and outlined by Dr. Russell Best of Omaha. The procedure I know is condemned by many and has many hazards but, in an occasional case, it may be of some value. The technique I used was as follows:

1. Decholin with Belladonna — 3 tablets after each meal and at bedtime.
2. Magnesium Citrate — 6 oz. each morning before breakfast.
3. Three tablespoonsful of pure cream before noon and evening meal each day.
4. Nitroglycerine — gr. 1/100th sublingually before evening meal each day.
5. Instill 5 cc. of Chloroform heated to 140° Fahrenheit on the first and second days.
6. Instill 5 cc. of Ethyl Ether on the third day. However, five minutes before this, give Nitroglycerine sublingually.





Figures 11 and 12.

These illustrations show a postcholedochotomy operative cholangiogram. After several months both of these patients required second operations.

I believe that operative cholangiography is valuable because unsuspected lesions may be discovered, it lowers the incidence of unnecessary common duct exploration, it increases safety of biliary tract surgery through its preliminary meticulous dissection and identification of structures, and it eliminates secondary operations by demonstrating overlooked common duct stones before abdominal closure.

New Drugs But Old Problems

LSD and other psychedelic drugs to come suggest that some will be devised to have far reaching benefits upon perception, memory and mentation that may produce a new breed of man . . . We are probably on the threshold of "well-healed" scientific inquiry into mind-memory learning, problem solving, thinking. Attempts to understand the operations of the brain must produce knowledge whose impact upon our civilization may be immense. We must consider in advance how to deal with the ethical, political and social problems that may arise, if a real psychedelic drug comes into existence. — Louis H. Nahum, M.D., in **Connecticut Medicine,** (30: 165), March 1966.

Second Look at New Drug Laws?

Many economists are convinced that the American system of patents and trademarks and brand names has been a vital factor in the great progress of the United States and its leadership in establishing a standard of living superior to that anywhere else in the world. The factors involved include not only this system but also the right to advertise, the right to disseminate information, and the right to legitimate pride in distributing as widely as possible the benefits of new inventions and discoveries. How much time must pass before the ultimate effects of the new (drug) legislation become apparent is difficult to predict. The effects are only beginning to be felt. Perhaps the time is near when the legislators will have to take a second look. — Morris Fishbein, M.D., in **Postgraduate Medicine,** (39:205-206), February 1966.

FOR RENT — Doctors' quarters in fastest growing community in Oregon. Write Springfield Pharmacy, 602 Main Street, Springfield, Oregon.



STAFFING OF THE "HOSPITAL EMERGENCY ROOM"

Mandatory participation on the "Emergency Room" panel of the hospital as a condition for staff membership and ultimately for hospital privileges, regardless of age, professional background and training, and personal desires, is a truism which is being foisted upon the members of many hospital staffs today. In some instances this is caused by the refusal of certain physicians to perform the obligations of their chosen profession, to care for their own patients twenty-four hours a day. In other instances it is a mechanism to get the hospital off the hook in the treatment of "drop-in patients"; those who have no physician or those who seek to avoid payment for services rendered. The physician, regardless of his professional background or other factors, has a moral obligation to render assistance in a bona fide emergency, until definitive therapy can be obtained. However, in a non-emergent situation each physician may choose whom he will serve. It has been shown that the majority of the patients who come to a hospital "Emergency Room" are not emergent and could have been handled most adequately in a physician's office. In the instance that a physician is forced to take "Emergency Room call", his right to choose whom he will serve is taken from him by the hospital, by his obligation to assume responsibility for any and all patients assigned to him, regardless of their "emergency" status.

Under the Medicare Program hospitals which participate will be expected to have out-patient departments and emergency services. Hospitals which are accredited by the Joint Commission will be considered to have complied with this directive. However, a recent directive from the Joint Commission to the effect that a physician must be available for treatment of patients within fifteen minutes of arrival at the "Emergency" department, is a bit perplexing and should cause considerable consternation, especially in a rural community such as South Dakota. This will be the subject of a resolution to be introduced into the House of Delegates of the A.M.A. Convention by the representatives from South Dakota, in June, 1966. If such a J.C. regulation remains in force, possibly subject to the scrutiny of an ambitious barrister, it could be most detrimental to the care of the patient.

In the instance of a physician who is highly skilled in a limited specialty of medicine and who attempts to practice his specialty proficiently, participation in an obligatory "Emergency Room" call system usually is an injustice to the patient as well as to the physician.

Many physicians are not aware of the fact that their malpractice insurance does not cover when they are acting in the capacity of "Emergency Room physician." Also, many physicians are not aware of the fact that they may be enjoined in a law suit for damages, which might result from inauspicious results of treatment by the physician to whom an emergency room patient may have been referred, despite the fact that the referring physician may never have seen the patient either in the "accident room" or elsewhere. No provision is made by the average hospital for insurance coverage of the physician who is "on call" for the emergency service, for the consequences of any legal repercussion which may arise as a result thereof. No provision is made either, for recompense to the physician who may be delegated this duty and who is enjoined in a law suit for time loss from practice, adverse publicity, or the other

unpleasantness which goes with possible litigation.

Another potential subject of consternation to the physician who undergoes obligatory servitude in the "Emergency Room" is the fact that he becomes responsible to the hospital administrator and subject to his whims in matters pertaining to the "emergency room."

Volunteer emergency call lists are employed in many hospitals to promote the care and welfare of the patients and to try to avoid making an obligatory and mandatory situation of the emergency room. This is enhanced if there are house staffs consisting of interns and residents, or if there is an active emergency room staff consisting of practicing physicians who are recompensed by one of several means. Adequate staffing of the out-patient department and the "emergency room" of the hospital demands much cooperation on the part of the entire hospital staff. However, in the long run, a voluntary program which utilizes the special training or capabilities of the various staff members, in their own fields, offers a much better likelihood of adequate care for the patient and harmony among the members of the medical staff.

J. B. Gregg, M.D.

GENERAL PRACTITIONERS WANTED. City of Lennox, South Dakota, offers unusual opportunity immediately for either single practitioners or partnership arrangement. Outstanding financial opportunity for either beginning doctors, or doctors desiring re-location. Exceptionally fine location in prosperous, stable Southeastern South Dakota area offering attractive surroundings, friendly associations, and busy practice with unlimited potentialities. Building available. Inquiries, personal visits welcome. Contact Fred Courey, City Mayor, Lennox, South Dakota.

GENERAL PRACTITIONER URGENTLY NEEDED: Small community near Sioux Falls is looking for a general practitioner to occupy new, fully equipped, air conditioned building. Other communities in immediate vicinity are also without physician. Area offers excellent recreational facilities — fishing, good pheasant hunting, and deer hunting. Interested physicians should contact Mr. W. L. Meyer, Humboldt, South Dakota 57035.

R. B. FLEEGER, M.D.
1886—1966

Robert B. Fleeger, M.D., well-known former chief surgeon at the Homestake Hospital, died May 11, 1966.

Robert Fleeger was born September 16, 1886, at Seafield, Indiana. In 1916 he was married to Maude Morrison, a nurse at the Homestake Hospital. Preceding him in death was Mrs. Fleeger in 1951 and their son, Robert M. Fleeger in 1960.

Dr. Fleeger served as chief surgeon and consultant for the Homestake Hospital for 24 years before his retirement in 1952. He joined the hospital staff on January 25, 1915 as a surgeon and was promoted to chief surgeon on February 8, 1928. He served in that capacity until October 1, 1951 when he was named consultant and surgeon. On July 1, 1952 he retired on pension with over 37 years of medical service to the community.

Dr. Fleeger was a past-president of the District Medical Society.

* * *

WILLIAM DUNCAN, M.D.
1905 — 1966

William Duncan, M.D., past-president of the South Dakota State Medical Association, passed away June 13, 1966.

Dr. Duncan was born in Marietta, Minnesota, on September 23, 1905. He married Katharine Peabody in 1933. Dr. Duncan had practiced medicine in Webster for 35 years.

Survivors include his wife; his mother; two daughters; and two sons.

* * *

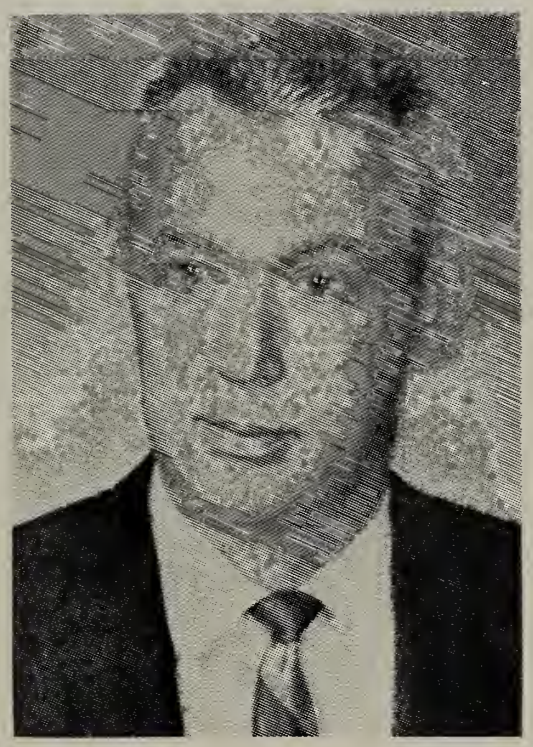
R. A. STANDARD, M.D.

R. A. Standard, M.D., an orthopedic surgeon from Aberdeen, South Dakota, and his wife were killed in the crash of their private plane in upper New York state.

The accident occurred on June 15th during a violent thunderstorm. Dr. and Mrs. Standard were on their way to Maine to pick up their three children, who were visiting there.

Dr. Standard opened practice in Aberdeen in 1961. He was retired from the Navy Medical Corps and had served on a naval hospital ship prior to going to Aberdeen.

PRESIDENT'S PAGE



I feel that it is a privilege to serve as your President for the next year.

It will be a year of turmoil and tribulation for our profession, with the "Medicare" program actually going into effect. The defects will become apparent to everyone and many of the inherent faults may be falsely blamed to us, who fought against it so diligently.

As your President, I shall try to represent you in the effort to amend and contain this governmental infringement into the personal and professional life of our nation.

We must all continue the fight for freedom, both professional and public. During this year, I am looking forward to visiting each District and with everyone's help, we may hope that the prospect will be brighter for the future.

Preston Brogdon, M.D.
President, South Dakota State Medical Association

UNIVERSITY OF MARYLAND

Letters to the Editor

UNIVERSITY OF SOUTH DAKOTA

May 20, 1966

South Dakota State Medical Association
Richard C. Erickson, Executive Secretary
711 North Lake Avenue
Sioux Falls, South Dakota

Dear Mr. Erickson:

This is to report to you on the use of your contribution of $100.00 to the Regional Science Fair held at the University of South Dakota at Vermillion on April 2. The funds were used to defray travel expenses of JoAnn Koepke, Hoskins, Nebraska, of Pierce Public High School, Pierce, Nebraska, to the International Science Fair in Dallas, Texas held May 11-14. She received no awards there but our other entrant, Curtis Bryant of LeMars, Iowa did receive four major awards so our region received some national recognition and we appreciate your help. Apart from awards as such the trip to the International Science Fair was a fine educational experience for these students.

Thanking you for your continued support, I remain,

Sincerely yours,
G. I. Moller
Professor of Physics

Hoskins, Nebr.
May 27, 1966

South Dakota State Medical Association
Richard C. Erickson, Executive Secretary
711 North Lake Avenue
Sioux Falls, South Dakota

Dear Mr. Erickson:

The trip to Dallas is behind me, also the mad rush of make-up tests that followed, topped off by Commencement.

The trip to the International Science Fair at Dallas will always hold a special place in my memories, and I do sincerely thank the SDMA for making it possible.

Although I did not win an award there, the knowledge I gained and the new and interesting friends I made are priceless. However, one judge did tell me that if I had built my own amplifier, (I borrowed one from my history teacher), I would have won an award. But they said without doubt mine was the least expensive, having cost me approximately seven dollars. They also seemed to find it hilarious that my brother's BB gun spring performed an important function on my machine.

All in all they were very helpful and gave me a lot of ideas for improving my project. One of the instructors at the Medical School in Dallas told me that he had never heard of anyone experimenting with the effects of novocaine on the chicken embryo and told me to keep on with it, I might come up with something.

Due partly to the fact I won the trip to Dallas I received a $500 Academic Scholarship to Doane College, Crete, Nebr., where I am taking my Pre-Med. Also, I obtained a job assisting in the lab, taking EKG's for one thing, in the new Lutheran Hospital at Norfolk, Nebraska.

Again I thank you for this unforgettable trip, and especially for the opportunity of meeting other young people my age who are as serious about going into medicine as I am.

All in all, it was the experience of a lifetime for me.

Gratefully yours,
JoAnn Koepke

---

819 Jane Street
Vermillion, South Dakota
May 18, 1966

Paul H. Hohm, M.D.
President, South Dakota State Medical Association
Tschetter-Hohm Clinic
Huron, South Dakota

Dear Dr. Hohm,

This year South Dakota was represented at the Student American Medical Association House of Delegates Convention by Dennis L. Johnson, Chapter President '65-'66, Delegate, Sioux Falls; Edmund J. Murphy, Vice-president '65-'66, Alternate, Watertown; Raymond Townsend, Chapter President '66-'67, Seattle, Washington; Laurens Willekes, Vice-president '66-'67, Camden, New Jersey; and Gerald Loos, Com-

mittee Chairman for Transfers, Huron. The convention was held at the Statler Hilton Hotel, Los Angeles, from May 11, until May 15, 1966. One-hundred-sixteen delegates representing sixty-six medical schools attended. The generous gift of $200.00 from the South Dakota Medical Association supported the expenses of one of the South Dakota delegates.

We were privileged to be the only delegation with more than one reference committee member. Denny Johnson was a member of the Reference Committee on Miscellaneous Business, while Ed Murphy was a member of the Reference Committee on Medical Trends. Similar to the AMA House of Delegates proceedings, the reference committees act as a forum and filter, providing open hearings on each of the resolutions assigned thus enabling them to derive and submit recommendations to the House regarding the disposition of each resolution. Therefore positions on the reference committees are instrumental in regulating and formulating the policy of the organization.

We received $500.00 from the Sears-Roebuck Foundation to be used as an emergency loan fund at our local chapter. Although the Chapter of the Year Award in our region went to Stritch-Loyola for tremendous improvement in the past year, South Dakota was recognized as being a consistently strong and active chapter.

Notable accomplishments of the national SAMA organization in the past year include:

1. The establishment of AAGP preceptorships through liaison with the national organization of the AAGP.
2. The formulation of a Directory of Externships in accredited hospitals through liaison with the AHA.
3. The establishment of International Preceptorships by liaison with the Committee on International Education.
4. Group insurance availability for books, "black bag items," and microscopes by negotiation with a national underwriting company.

A listing of noteworthy business conducted is as follows:

MEDICAL EDUCATION

1. Endorsement of medical career recruitment programs.
2. Endorsement of establishment and publication of overseas service programs in underdeveloped countries.
3. Endorsement of publication of SAMA-Affiliated preceptorships.

MEDICAL TRENDS

1. Failed to endorse establishment of uniform medical licensure requirements among the states.
2. Establishment of a Medico-Legal Committee.
3. Endorsement of the teaching of medical ethics as a part of medical curricula.
4. Referred Coggeshall Report to committee for consideration.
5. Proposed no action concerning liberalization of state abortion laws.

LEGISLATION

1. Endorsement of a tax deduction/credit corresponding to costs of tuition, books and essential equipment, applicable to the education of students in the professions.
2. Endorsement of a wider research fellowship program for medical students.
3. Defeat of substitution of Peace Corps, or work in sparsely populated areas, for draft or military liability.

MISCELLANEOUS BUSINESS

1. Endorsed inclusion of a summary of the convention proceedings to be included in a fall issue of the **New Physician.**
2. Defeated the use of polls as a policy determining procedure.
3. Made recommendations to improve distribution of the **New Physician.**
4. Established a column in the **New Physician** entitled "National Medical Forum" to contain articles of divergent opinion to be credited in editorial fashion.

ELECTION OF OFFICERS

(National Organization)

President Blair Behringer, Missouri
Vice-president John Olds, Tennessee
Treasurer Richard Flannigan, Jefferson
Region Five Vice-president David Kindig, U. Chicago

Numerous lectures composed the academic-scientific aspects of the convention and several social gatherings rounded out the program.

All who attended gained valuable experience in the proceedings and will be able to represent South Dakota interests well in future proceedings.

Sincerely yours,
Dennis L. Johnson

(More on Page 39)

UNIVERSITY OF MARYLAND

DEADWOOD DOCTOR

F. S. Howe, M.D.

CHAPTER III

Bullets and Babies

Practice in Deadwood had nothing if not variety. Part of the time I was at the doctor's age-old trade of bringing babies into the world, part of the time I was patching up the knifings, gun-shot wounds and mine accidents of our lively community.

Mine accidents were very common in the Black Hills at the time I first located here and for a number of years afterward. There were a number of small gold mines which absolutely neglected safety rules.

I had one interesting experience with a fairly good-sized mine in which there was a missed hole — in other words, one of the blasts failed to fire. The miner went back in and started to break down the rock by hand. He picked right into the missed hole. The pick entered his chest and penetrated the right lung. He was just one mass of powder, dirt, rock and caps. This occurred at Trojan, which was about eight or nine miles from Deadwood by the nearest route, which could be used only in the summer. I told the men to get a mattress, a team and spring wagon and come to the hospital as rapidly as they could. I made arrangements for X-rays and care upon their arrival.

Practically the whole population of Trojan came down with the unfortunate miner to watch him draw his last breath. I spent the rest of the day picking rock and debris out of the man's face and body and turned over the care of the eyes to the late Dr. W. L. Vercoe, Oculist. The man was breathing right through the hole made by the pick in his chest and another doctor who was present, asked why I'd waste my time on that dying man. At that time we had no such thing as plasma, blood, glucose; nothing but saline solution. For some reason he did not develop pneumonia as I had expected, and in time, made an excellent recovery, except for the fact that he had only a small amount of eyesight left.

The miner's ultimate fate was rather interesting. Possibly some twenty years later, I was called up to Trojan on New Year's night. This same man had broken into a cabin where there was a party composed of his wife who had left him, his brother-in-law and some others, and started shooting. He killed his brother-in-law instantly and attempted to kill his wife. The shotgun charge went through her upper arm but did not prove fatal. He disappeared and about a week later his body was found in a cabin several miles away where he had committed suicide.

The Belle Fourche Irrigation Project was instituted some years later; about 1907. At that time this was the largest earth dam in the United States and all the work was done by team and skips. They had no modern machinery as they have now. Most of the labor came from the Bowery and Clark, Halstead and Maxwell Streets in Chicago. Needless to say there were some of the toughest men who ever came to the Black Hills.

Paydays at that time were once a month. When these men had a payday, they, of course, came in a body to Deadwood to spend their money. They would start out on beer at a dollar a bottle and as they got a little farther along, at the urging of their female companions, they changed over to champagne at five dollars a bottle. Many of them ended up with various wounds which had to be repaired. Almost invariably they spent all their money before they were wounded.

At the Combination Theatre at the time, the official bouncer was an ex-heavyweight who was really tough. When the boys ran out of money, he would pick them up and not lead them but throw them out on their heads on the paved street. On this particular night one of the boys from the Bowery had been unwise enough to get the bouncer's sweety as a companion. They occupied one of the boxes at the Combination Theatre, and the official bouncer decided that it was about time to set this little fellow out where he belonged. He grabbed him by the collar and started out with him, but the program didn't go as per usual. The little Irishman from the Bowery slipped a knife out of his sleeve and started to carve.

His first swipe was at the throat where he cut the external jugulars and many of the large vessels but failed to get the carotid or internal jugular veins. From the throat, he went right on down in very artistic fashion, leaving about three inches between each curve. Fortunately, all of his incisions were made on a curve and merely nicked the ribs instead of going on through.

I was called down and took the bouncer to the hospital where I spent the rest of the night

sewing up the wounds, using somewhere between 100 and 200 sutures. In spite of his loss of blood, he remained in fairly good condition. On the second day after his injuries, he showed signs of delirium and became so violent that it was necessary for us to call the sheriff and have him placed in jail. I made a trip down to the jail to change his dressings and found him standing in front of his cage, grabbing the bars and shaking them. He was so strong that he shook the entire building.

I immediately decided that a straight jacket and some help were required to change his dressings. With the aid of a straight jacket and six men, we changed his dressings and a few days later removed the sutures. All wounds healed by primary intention, but it was necessary, of course, to send this man to the state asylum at Yankton where he died some years later.

So far as I can remember the man who wounded him was not even arrested. In fact, the whole community seemed to be relieved to think that there was somebody who finally gave the bouncer what he had been looking for.

A little later I had a case that I thought was very interesting. A fine looking boy about 21 years old, hailing from Chicago, thought he would like to see the Wild West. He arrived in Deadwood with little or no money and in his various travels found a lady at the Mansion who seemed to be a willing meal ticket. Everything was going lovely until a friend of hers, a sheep herder, came in and found that he had lost his happy home. At that time, it was the universal custom for all cowpunchers, sheep herders and so on from the north country who came to town to deposit their gun with the bartender at the saloon where they made their head-quarters. This sheep herder followed the usual custom of depositing his gun with the bartender at the Mansion and so far as I know said nothing about losing his girl. After the usual number of days when he had spent his six months' pay on gambling, whiskey and women, he went to the bartender about 5:30 in the evening, (the train from Deadwood to Belle Fourche left at 6 P.M.) and asked for his gun saying that he was ready to go home. As usual, the bartender asked him if he needed any money. The sheep herder, having spent all his money, said that he needed money, and the bartender gave him a dollar to pay his car fare to Belle Fourche. The sheep herder went upstairs ostensibly to get his satchel and clothes.

Instead, he broke in the door of the girl's room and started shooting with his 45 Colts. The first shot got the boy through the lower lumbar region of the spine. The girl, with her little pet dog, slipped under the bed and was unharmed.

Evidently thinking that he had killed the young man, the herder put the 45 Colts right to his chin and pulled the trigger. I was there within five minutes after it happened, and it was really a gruesome sight. Brains were scattered all over the ceiling and blood was all over the floor. I had to take one big jump to get over to the bed where the young man was. We called the ambulance and took the boy out through the window, as there was nobody brave enough to go through the door.

I found that the bullet had gone through the spine but had not come out. The general condition of the young man was good. He later showed some paralysis of the bowels and bladder and also of the left leg and foot, and lost two or three toes on his left foot.

The boy's mother who was a widow living in Chicago came out to see him and remained with him until he was ready to go back to Chicago. He was very insistent on having the bullet removed. I told him that the bullet was doing him no harm and that there was no reason for removing it but he wanted it out. At that time X-rays were not too accurate in locating foreign bodies and I decided to go in through the abdomen and make a try at getting the bullet, a 45. My idea worked out all right and I was able to remove the bullet. I still think I had a lot of luck.

The lad's recovery was uneventful and I heard nothing more from him. A year or more later, the late Dr. Freeman and myself were in Chicago on one of our annual trips, a nice looking man came and shook hands with me, calling me by name, when we were sitting in the lobby of the Sherman Hotel. He said, "I guess you don't remember me." "No, I've never seen you before so far as I know." He said, "Let me take a little walk and see if it doesn't remind you of something." He walked back and forth once or twice. The limp was sufficient for me to identify him and I said that he was Dick So and So and he answered that he was. When I asked him what he was doing, he told me that he was house detective at the Sherman Hotel. That was the last time I've ever seen him.

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Normal obstetric routine, if you were called to the country was to stay with your case till it was over, regardless of whether it was twelve hours, twenty-four hours or what.

In town there were certain cases where you almost had to remain and others where you would wait for the second call. However, you had to be careful, because in most cases there was no one caring for the patient who knew enough about it to gauge their call correctly. The normal procedure in most cases was to have some neighbor woman or midwife in to take care of the baby, although plenty of times the doctor had to bathe and dress the baby himself. In some cases we had fairly well-trained midwives who were of real help.

No patient thought of going to the hospital for a confinement. In fact, it has only been the last few decades that we have been able to insist on all of our patients going to the hospital. There was little or nothing used for pain, although sometimes a small amount of chloroform was given.

Strange to say, nearly all mothers and babies got along fine. We not only had no antibiotics, but we didn't have to worry about RH positives and negatives.

We took care of all obstetric cases in the home and very rarely saw any of them before we were called upon to take care of them. I had a rather interesting experience with a foreign lady. I had spent a hard day on the case all day long before the baby was delivered. The next day about noon I went down to make my usual visit. I had a horse at that time that had been on the track and was a very fine animal but he had to be very carefully tied to the fence or post or he wouldn't be there when I came back. It was during the winter and there were a lot of sleigh bells, so it took me about five minutes to take care of the horse to tie him up properly.

When I got out to tie my horse, I saw a woman chopping wood in the back yard. She looked very familiar but I didn't recognize her. After I got my horse properly taken care of, I went into the house and found the husband and three other men in the front room playing poker. In the back room this woman was in bed covered up very nicely. I, at once, recognized her as the same woman who had been chopping wood in the back yard. She saw me and slipped into bed. I let her think I hadn't seen her.

Now I know that she was merely ahead of her time. At that time it was absolutely essential that we keep a woman in bed nine or ten days after the birth of the baby.

I have taken care of a number of confinement cases where there was not only no woman to bathe and dress the baby but where there were no clothes. I was called upon to dress the baby and when I asked where the clothes were, found that the mother had intended to get some clothes but just didn't get around to it. I would wrap the baby in cotton and on one occasion used the only thing that was in the house, the dish towel, for a diaper, and wrapped the rest in cotton. I told them when they got some clothes, they could go ahead and dress the baby. Those babies always did all right.

When I had been in Deadwood only a few months, I was called out to the country to take care of an obstetric case. A man came in the very early morning to get me. I intended to get a livery team, but he told me that he had a horse and rig waiting for me. We drove out about six miles in the country. I could have walked much easier and quicker. When we arrived, I found very little doing. At that time one stayed right on the case until it was finished because of the slow transportation facilities. I stayed there from early morning until late that night giving the patient quinine, strychnine, nearly everything in the book, without any results. When it came time for dinner, the husband got the meal ready and I sat down to eat.

I was very hungry but when I saw what we had and also the general surroundings, my appetite was not so good. I did manage to get down a little greasy soup and a few soda crackers. I was not able to eat the bread, drink the coffee or eat any of the other food. In the evening I was hungry but ate nothing. I finally got through with the case and headed for home about ten o'clock that night.

The next day was Thanksgiving Day. I asked my roommate, Robert P. Stewart, a brilliant young attorney who also hailed from Pennsylvania, if he wouldn't like to make a trip to the country with me. He said that he would and when we got to our destination he came into the house with me but for some reason that I failed to understand at the time he immediately liked the outdoor air. It was very chilly but my call was short this time and when we started for home I asked him why he didn't stay by the fire

to keep warm. He said, "Say, I had to get out and get out fast. I couldn't stay in that kind of a place. It was too much for me." I asked him how he would have liked to stay the whole day like I had. He said, "I'm afraid I wouldn't want to be a doctor."

The doctors of today would never dream of trying things that we of that day not only tried but tried successfully. The most difficult kind of obstetric cases were taken care of in mining camps at home without any trained help whatsoever. I well remember one time when I was called to Galena, a mining camp eleven miles away, very early one morning. In those days we never saw an obstetric case until we were called upon to take care of them. I got a team and drove to Galena, where I spent the entire day with no results whatever. Along late in the afternoon I decided that operative interference was absolutely essential. I placed the patient across the bed, boiled all instruments and gloves and put her to sleep with chloroform, which we used in those days, turned it over to a midwife who had had a lot of experience to continue with the chloroform. I started out with four assistants, including the husband, but after I had worked for a short time one after another of the assistants faded away, some of them fainting. The midwife was also going to desert.

As she was all I had left, I had to use some pretty strong language and abused her for posing as a midwife when she couldn't take it. This angered her sufficiently so that she stuck. After more than two hours of the hardest work I ever did in my life, we delivered a big baby boy. Both mother and baby lived. The next morning I sent a nurse out on the Galena Stage to take over.

A big snow came along, and it was more than a week before a vehicle of any kind could get to Galena. The nurse phoned me every day, reporting temperature, pulse and general condition. Recovery was practically uneventful.

(To be Continued)

The Importance of Drug Advertising

The importance of the advertising industry in the economic development of our country is well-recognized and, more specifically, in the development of use of new and better drugs. Practicing physicians receive a substantial part of their education concerning drugs through the medium of prescription drug advertising. This indeed, is basic and underlies the Federal law which places responsibility on the advertising industry to present factual and undistorted information to the physician. Furthermore, the prescription drug advertising provision of the law actually is a recognition of the importance of such advertising in the entire area of medical care in the United States. — Joseph F. Sadusk, Jr., M.D., in **Current Therapeutic Research,** (7:332), May 1965.

(Continued from Page 35)

June 3, 1966

Mr. Richard C. Erickson, Business Manager
South Dakota Journal of Medicine
711 North Lake Avenue
Sioux Falls, South Dakota 57104

Dear Mr. Erickson:

Thank you very much for your letter of May 31, and the May issue of the SOUTH DAKOTA JOURNAL OF MEDICINE.

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With best regards,

Delmar L. Pettigrew
Medical Representative
Dorsey Laboratories

4808 Baldwin
Rapid City, South Dakota
June 1, 1966

Mr. Richard C. Erickson
711 North Lake Avenue
Sioux Falls, South Dakota

Dear Mr. Erickson:

I would like to express my appreciation to you for your kindness in sending me the May issue of **South Dakota Journal of Medicine** in which my company, Dorsey Laboratories, had placed an advertisement.

The issue will prove very valuable to me, and it was a very nice gesture on your part.

Sincerely yours,

Darryl L. Pennapacker
Medical Sales Representative
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Pop's Proverb

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NEWS NOTES

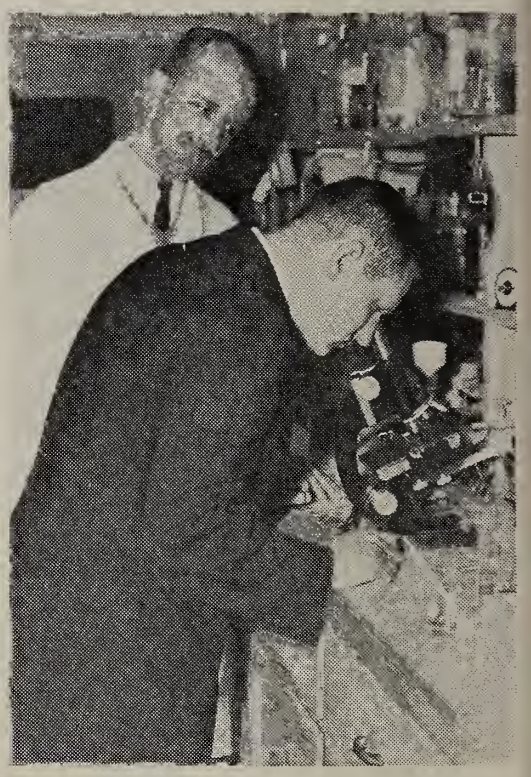
The Broadmoor, Colorado Springs, Colorado, will be the headquarters for the Colorado Medical Society's 96th Annual Session, September 25-28. In addition to numerous social functions planned, there will be three mornings of scientific section meetings. Specialty groups cooperating with the Medical Society in preparation of the program include the Academy of General Practice, the Society of Internal Medicine, Academy of Surgery, and several others.

No registration fee is charged members of any recognized medical society. Hotel reservations should be made direct with The Broadmoor, Colorado Springs. Additional details about the Session may be obtained by writing the Society at 1809 East 18th Avenue, Denver, Colorado 80218.

* * *

The 12th annual meeting of the Flying Physicians Association will be held at the Dunes Hotel, Las Vegas, September 11-16, according to **Richard B. Leander, M.D.,** Sioux Falls, who heads the association's South Dakota chapter.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED



Bacteria suspected of causing disease in laboratory animals are shown to Donald C. Barr of Sioux Falls by Nicholas Anagnostakos, quality control biologist at Lederle Laboratories, pharmaceutical division of American Cyanamid Company. Mr. Barr, Lederle representative in this area, reviewed the latest achievements in medical science during a week long conference recently held at the laboratories in Pearl River, New York.

Otto J. Tommeraason, Madison pharmacist, has been honored by the South Dakota Pharmaceutical Association as its 1966 recipient of the A. H. Robins "Bowl of Hygeia" Award for outstanding community service.

* * *

A recognition dinner was held recently by St. Luke's Hospital in Aberdeen to honor **Dr. Paul G. Bunker.** Dr. Bunker recently was awarded the Chevalier Jackson Award for outstanding achievement in broncho-esophagology.

T. J. Wrage, Jr., M.D., Watertown, was named president of the South Dakota Heart Association for the 1966-67 fiscal year. **G. E. Tracy, M.D.,** also of Watertown, was one of two vice presidents elected. In addition, Dr. Tracy was given a service recognition award for his work with the Heart Association.

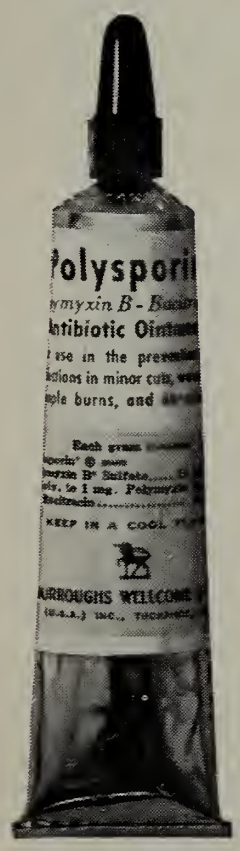
* * *

T. R. Pfisterer, M.D., has announced the termination of his medical practice with the Medical Arts Clinic in Redfield. He and his family have moved to Phoenix, Arizona, where Dr. Pfisterer will join the staff of the Park Southern Medical Clinic.

* * *

The Whetstone Valley District Medical Society held their May meeting at the Fireside Inn in Rosholt. Members of the Medical Society's Auxiliary met with their husbands for dinner before holding their Auxiliary meeting.

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Dextro-amphetamine sulfate: Use by unstable individuals may result in psychological dependence.

Meprobamate: Careful supervision of dose and amounts prescribed is advised; especially for patients with known propensity for taking excessive quantities of drugs. Excessive and prolonged use in susceptible persons, e.g. alcoholics, former addicts, and other severe psychoneurotics, has been reported to result in dependence. Where excessive dosage has continued for weeks or months, reduce dosage gradually. Sudden withdrawal may precipitate recurrence of pre-existing symptoms such as anxiety, anorexia, or insomnia; or withdrawal reactions such as vomiting, ataxia, tremors, muscle twitching and, rarely, epileptiform seizures. Should meprobamate cause drowsiness or visual disturbances, reduce dose—operation of motor vehicles, machinery or other activity requiring alertness should be avoided. Effects of excessive alcohol consumption may be increased by meprobamate. Appropriate caution is recommended with patients prone to excessive drinking. In patients prone to both petit and grand mal epilepsy meprobamate may precipitate grand mal attacks. Prescribe cautiously and in small quantities to patients with suicidal tendencies.

Side Effects: Overstimulation of the central nervous system, jitteriness and insomnia or drowsiness.

Dextro-amphetamine sulfate: Insomnia, excitability, and increased motor activity are common and ordinarily mild side effects. Confusion, anxiety, aggressiveness, increased libido, and hallucinations have also been observed, especially in mentally ill patients. Rebound fatigue and depression may follow central stimulation. Other effects may include dry mouth, anorexia, nausea, vomiting, diarrhea, and increased cardiovascular reactivity.

Meprobamate: Drowsiness may occur and can be associated with ataxia, the symptom can usually be controlled by decreasing the dose, or by concomitant administration of central stimulants. Allergic or idiosyncratic reactions: maculopapular rash, acute nonthrombocytopenic purpura with petechiae, ecchymoses, peripheral edema and fever, transient leukopenia. A case of fatal bullous dermatitis, following administration of meprobamate and prednisolone, has been reported. Hypersensitivity has produced fever, fainting spells, angioneurotic edema, bronchial spasms, hypotensive crises (1 fatal case), anuria, stomatitis, proctitis (1 case), anaphylaxis, agranulocytosis and thrombocytopenic purpura, and a fatal instance of aplastic anemia, but only when other drugs known to elicit these conditions were given concomitantly. Fast EEG activity, usually after excessive dosage. Impairment of visual accommodation. Massive overdosage may produce drowsiness, lethargy, stupor, ataxia, coma, shock, vasomotor, and respiratory collapse.

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Chao, D.; Sexton, J. A.,

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THE SOUTH DAKOTA

JOURNAL OF MEDICINE

**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **August, 1966** **Number 8**

CONTENTS

Transactions of the South Dakota State Medical Association, Eighty-fourth Session 19

Officers and Councilors — S.D.S.M.A. 19

Committees and Commissions 19

Budget and Audit Committee Meetings 20

Council Meetings 21

Meetings of the House of Delegates 23

Reports of Councilors and Officers as Adopted by the House of Delegates 26

Reports of Committees as Adopted by the House of Delegates 37

Distinguished Service Awards 51

Fifty Year Club Members 51

Roster — by Districts 1966 52

Roster — by Alphabet — 1966 55

President's Page 58

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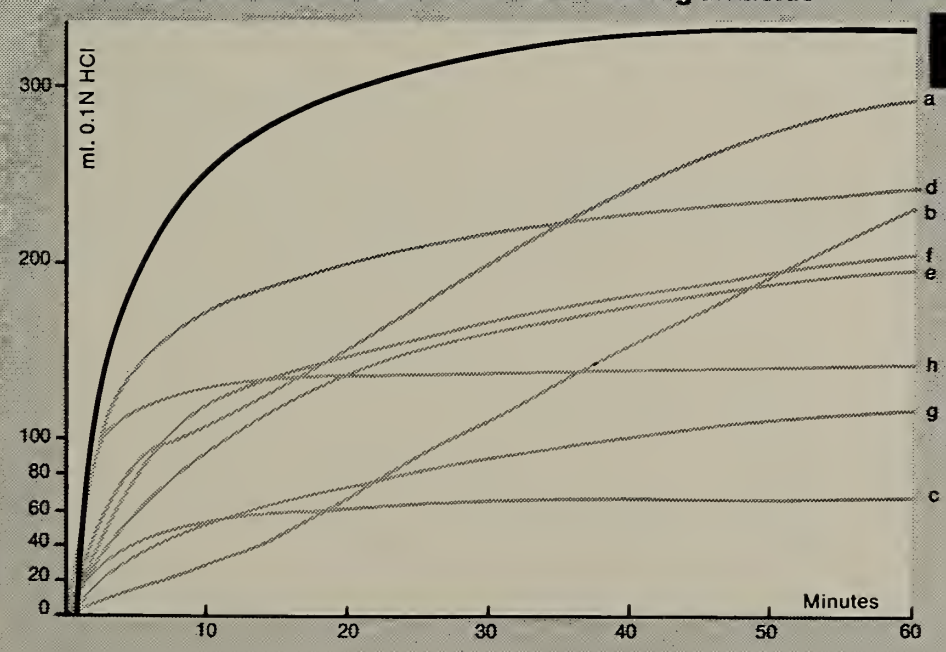
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Volume XIX **August, 1966** **Number 8**

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REPORT OF THE BUDGET AND AUDIT COMMITTEE

May 21, 1966
The Inn, Huron, South Dakota

The Budget and Audit Committee met at 9:00 A.M. on Saturday, May 21, 1966. Present were Drs. D. L. Scheller and A. P. Reding. Also attending the meeting were Richard C. Erickson, Robert Green and Patty Butler.

The Committee reviewed the CPA Audit. Dr. Scheller moved that the audit be accepted. The motion was seconded by Dr. Reding and carried.

The Committee discussed the year-end financial report and noted that approximately $8,200.00 was outstanding in dues payments for 1966.

The Committee meeting adjourned at 9:45 A.M.

BENEVOLENT FUND FINANCIAL STATEMENT

March 1, 1965-March 1, 1966

Balance in Bank, March 1, 1965		$4,693.55
INCOME		
Interest	$465.23	
Donations	745.00	
	$1,210.23	
TOTAL INCOME		1,210.23
Balance in Bank, March 1, 1966		$5,903.78
Assets of this Fund as follows:		
Government Bonds	$ 3,000.00	
Loans (18)	7,550.00	
Cash in Bank	5,903.78	
	$16,453.78	

OBITUARY RECORD REPORT

T. W. Murphy, M.D., Bristol, died in May, 1965.
Arnold K. Myrabo, M.D., Sioux Falls, died in June, 1965.
Joseph F. Malloy, M.D., Leola, died in July, 1965.
M. O. Pemberton, M.D., Deadwood, died in October, 1965.

A meeting on Medical Ethics held in Chicago on March 5th and 6th was to be attended by the Commission Chairman, Dr. Scheller, but the blizzard made it impossible to get there.

BUDGET COMMITTEE

The Budget Committee met at the association office on December 16, 1965, and approved the following budget for the year 1966-67.

INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
State Dues	$47,500.00	$47,500.00
Annual Meeting	9,000.00	9,000.00
Interest	400.00	400.00
Refunds & Misc.	1,000.00	1,000.00
Car reimbursement	690.00	1,080.00
	$58,590.00	$58,980.00

GROUP LIFE INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Premiums	$30,000.00	$30,000.00

GROUP LIFE—EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Payment to Insurance Company	$29,100.00	$29,100.00
Postage	50.00	50.00
Legal & Audit	50.00	50.00
Supplies	50.00	50.00
Balance to Surplus	750.00	750.00
	$30,000.00	$30,000.00

AMA DUES—INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Dues Payments from Doctors	$17,000.00	$18,000.00

AMA DUES—EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Payments to AMA	$17,000.00	$18,000.00

BUILDING FUND—INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Blue Shield Rent	$ 4,800.00	$ 5,100.00
Association Rent	3,000.00	3,000.00
Journal Rent	300.00	300.00
Bd. of Ex. Rent	300.00	600.00
Nurses Assoc. Rent	900.00	1,080.00
OAA Rent	2,250.00	2,400.00
	$11,550.00	$12,480.00

BUILDING FUND—EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Janitor & Repair	$ 1,900.00	$ 2,300.00
Utilities	1,600.00	1,800.00
Interest	2,600.00	2,600.00
Repay. of Loans	2,450.00	2,780.00
Legal & Audit	1,000.00	1,000.00
Taxes & Insurance	2,000.00	2,000.00
	$11,550.00	$12,480.00

EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Salary, Exec. Sec.	$ 5,400.00	$ 6,600.00
Salary, Other	11,500.00	10,500.00
Social Security	500.00	700.00
Legal & Audit	650.00	1,200.00
Tele. & Telegraph	1,500.00	1,800.00
Office Supp. & Equip.	2,500.00	2,500.00
Dues & Subscrip.	1,500.00	1,500.00
Officers Travel	2,500.00]	Out of
Physician Travel	2,000.00]	State
		4,500.00
Annual Meeting	7,500.00	8,000.00
Public Relations	4,000.00	3,500.00
Rent	3,000.00	3,000.00
Miscellaneous	100.00	100.00
Postage	1,800.00	2,200.00
Legis. Expense	1,500.00	2,200.00
Benevolent Fund	400.00	400.00
Medical School Endow.	200.00	200.00
Ladies Auxiliary	800.00	800.00
Car Expense	1,800.00	1,100.00
Clinical Pathology	1,000.00	800.00
Staff Travel	4,500.00	4,500.00
Insurance	200.00	100.00
Employment Tax	25.00	25.00
Employee Relations	1,150.00	1,600.00
Reserve	2,565.00	1,155.00
	$58,590.00	$58,980.00

JOURNAL INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Advertising	$18,000.00	$18,000.00
Subscriptions	1,200.00	1,200.00
Miscellaneous	600.00	600.00
Refunds	200.00	500.00
	$20,000.00	$20,300.00

JOURNAL EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Salary, Editor	$ 1,440.00	$ 720.00
Salary, Staff		2,400.00
Legal & Audit	50.00	50.00
Rent	300.00	300.00
Tele. & Telegraph	175.00	175.00
Social Security		100.00
Office Supplies	17,835.00	16,255.00
Postage	200.00	200.00
Travel		100.00
	$20,000.00	$20,300.00

Respectfully submitted,
COMMISSION ON INTERNAL AFFAIRS
D. L. Scheller, M.D., Chairman
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Bill Hanson, M.D.
C. Rodney Stoltz, M.D.

A discussion was held concerning the work of the Commission on Internal Affairs and the proposed By-Laws change concerning the House of Delegates. Dr. Hohm moved for acceptance of the report. Motion seconded by Dr. Tank and carried.

Dr. M. R. Cosand, chairman, Commission on Liaison with Allied Organizations, submitted no report.

Dr. R. H. Quinn, chairman, Commission on Legislation and Governmental Relations gave a verbal report. Dr. Lietzke moved for acceptance of this report; seconded by Dr. Leigh and carried.

FIRST COUNCIL MEETING
May 21, 1966
The Inn, Huron, South Dakota

Dr. J. T. Elston, chairman of the Council, called the meeting to order at 10:00 a.m. Roll call was taken by Richard C. Erickson, executive secretary. The following physicians were present: Drs. Paul Hohm, P. P. Brogdon, J. J. Stransky, A. P. Reding, R. H. Quinn, E. J. Perry, G. Robert Bartron, M. C. Tank, A. J. Tieszen, Fred Leigh, Harvard Lewis, E. T. Lietzke, Clark Johnson, J. T. Elston, H. E. Lowe, and E. A. Johnson. Commission chairmen present were Drs. J. B. Gregg, George W. Knabe, Jr., R. H. Quinn, M. R. Cosand and D. L. Scheller. Also present were Dr. Saylor and Dallas Whaley.

Dr. Perry moved that we dispense with the reading of the minutes of the previous meeting. It was noted that the names of Dr. Fred Leigh and Dr. Clark Johnson were omitted from these minutes. Proper correction was made. Motion was seconded by Dr. Tank and carried.

COMMISSION REPORTS

Dr. J. B. Gregg, chairman of the Commission on Medical Service, gave an oral report. The Basic Science Board will consider the request to revise their reciprocity regulations at the June meeting. The Commission on Medical Service recommends that the State Association take no action on the proposed expansion of the medical school in South Dakota at the present time. Dr. Tank moved for the acceptance of this report and it was seconded by Dr. Perry and carried.

Dr. George Knabe, Jr., chairman of the Commission on Scientific Medicine, gave an oral report on the meeting held May 7.

REPORT OF THE COMMISSION ON SCIENTIFIC MEDICINE

No. 9 May 10, 1966

The Commission met May 7, 1966 from 1:00 to 4:00 P.M. at the SDSMA office in Sioux Falls. Present were Drs. R. E. Nelson, N. deDianous, R. B. Leander, G. W. Knabe, J. F. Barlow, representing the S. D. Society of Pathologists, Mr. John R. Mullen, USPHS field officer for the tuberculosis control program and Mr. R. C. Erickson.

1. **Tuberculosis Control Program:** Mr. Mullen gave information on the current operation of the program. Patients are now being treated in certain South Dakota hospitals as well as at Mineral Springs, Cannon Falls, Minn. and National Jewish Hospital, Denver. Average daily hospital cost per patient has been $22.50 although in a few hospitals it has been as high as $53.00. Cost at Sanator was about $25.00. Cost for out-of-state care has been as low as $16.00. The

State Health Department will explore contractual arrangements with principal hospitals in effort to reduce costs. Laboratory charges have varied. Drug costs have been increasing. Program is more expensive now than before.

There are about 165 new active cases yearly, 58 of these non-Indian. 955 people in South Dakota now have active tuberculosis. 64 are hospitalized; 23 are in institutions primarily because of other diseases. 868 are at home, many of these with disease in undetermined state not having been checked in the past 6 months. Health Department goal is to get them treated, trained to care for themselves and proven inactive for 5 years. A proposed system of clinics for diagnosis and patient education is under consideration.

A USPHS medical officer will be assigned by CDC to the State Health Department for 2 years beginning June, 1966 with responsibilities in the TB program. The Commission urges that soon after his arrival he be directed to meet with the Commission or its ad hoc Committee on Tuberculosis. He could also be invited to visit medical district meetings for orientation purposes.

No consideration has been given to a review of the fee schedule. The Commission recommends that the SDSMA relative value scale be used.

Dr. deDianous advised that the S. D. Tuberculosis and Health Association is making changes in its organization and is re-evaluating objectives. As a priority goal, the Association hopes to initiate development of an interagency council on TB composed of representatives from the various state groups and agencies concerned with control and treatment of tuberculosis. Major goals are to promote better case finding and contact investigation, promote assured treatment and minimum five year follow-up of all newly discovered cases and known cases, encourage prophylaxis of contacts of active cases and recent converters who are under three years of age, achieve the standard that at any given time at least 80% of all cases at home with active disease at last report should have had a bacteriological examination within the preceding 6 months.

The Commission urged that the State Health Department give consideration to SDSMA's proposal for a system of regional diagnostic and treatment centers. This plan, endorsed by the S. D. Tuberculosis and Health Association was presented to the Health Department September 22, 1965 but no action has yet been taken on it.

George W. Knabe, Jr., M.D.
Chairman, Commission on
Scientific Medicine

Dr. Bartron moved that the information on the diagnostic center from the ad hoc committee of the Commission on Scientific Medicine be submitted to the chairman of the Commission on Scientific Medicine and the chairman of the Commission on Legislation and Governmental Relations to be reviewed prior to the June 10 meeting. Motion was seconded by Dr. Leigh and carried. Dr. Tank moved for the acceptance of the report as a whole. Seconded by Dr. Reding and carried.

Dr. R. H. Quinn, chairman of the Commission on Legislation and Governmental Relations, gave a verbal report. Motion for acceptance of this report was made by Dr. Lietzke and seconded by Dr. Tank and carried.

Mr. Erickson gave the report of the Commission on Communications concerning the proposed poison information cards. Dr. Hohm moved that the poison card program be accepted by the Council as a public relations project. Seconded by Dr. Clark Johnson and carried.

Dr. Bartron moved for acceptance of this Commission report, seconded by Dr. Lewis and carried.

Dr. M. R. Cosand, chairman of the Commission on Liaison with Allied Organizations, gave no report.

Dr. D. L. Scheller, chairman of the Commission on Internal Affairs, gave no report.

Dr. A. P. Reding gave a report of the Budget and Audit Committee. Dr. Leigh moved that the Council give a vote of confidence to Mr. Erickson regarding the policy on delinquent dues. Seconded by Dr. Tank and carried. Dr. Perry moved for acceptance of the report of the Budget and Audit Committee, seconded by Dr. Clark Johnson and carried.

OLD BUSINESS

Discussion was held concerning the Medicare Public Relations Program. Dr. Hohm moved that the Council recommend to the House of Delegates that any medicare public relations program should be left up to the individual districts, and that the Association should not act on a State level, at this time. Motion was seconded by Dr. Tank and carried.

NEW BUSINESS

Mr. Erickson discussed the addition to the medical association building.

Dr. Stransky moved to table the matter until the second Council meeting on Monday evening. Seconded by Dr. Hohm and carried.

Mr. Erickson and Dr. Saylor discussed the State Welfare programs. Dr. Saylor, a member of the Welfare Commission, made a brief report to the Council concerning the developments of Title 18 and 19 of the Medicare Law and how they will affect medicine in South Dakota in the future. The matter will be discussed at the next Council meeting.

DIVISION OF VOCATIONAL REHABILITATION

Pierre, South Dakota
April 19, 1966

Mr. Richard C. Erickson
Executive Secretary
South Dakota State Board of
Medical and Osteopathic Examiners
711 North Lake Avenue
Sioux Falls, South Dakota

Dear Mr. Erickson:

In 1964 our Agency submitted fee proposal material to the South Dakota State Medical Association for consideration. This was later approved by the Council of the South Dakota State Medical Association to be effective February 1, 1964.

The following insert reveals the fees established as related to the code, nomenclature, units and cost per unit:

Relative Value Study

Code	Nomenclature	Units	Cost Per Unit	Fee
001	Office Call, first visit, new patient routine history and necessary examination (Attached General Medical Examination Form to be used)	2	5	$10.00
8675	Blood Serology Test (Kahn, VDRL)	.6	5	3.00
8930	Urinalysis (Routine Chemical)	.2	5	1.00
8931	Urinalysis (Quantitative Sugar)	.2	5	1.00
	Total Cost of General Medical Report			$15.00

Code	Nomenclature	Units	Cost Per Unit	Fee
9036	**Written Report Short Form — R-3a** (Information from records only, no exam.)	1	5	$ 5.00
	Narrative (Information from records only, no exam.)	2	5	10.00

With the issuance of the 1965 Relative Value Study and procedure nomenclature in June 1965, it becomes necessary that our agreement on fees be brought in accordance with the new publication. We have endeavored to relate the coding for services in the first Relative Value Study to the Second Edition dated

June, 1965. The following updating is being proposed:

Code	Nomenclature	Units	Cost Per Unit	Fee
9006	Intermediate follow-up or initial examination, necessitating professional care over and above routine visit	2	5	10.00
8661	Complement fixation tests (Wassermann, Kohlmer, etc.)	1	5	5.00
8934	Routine chemical and microscopic	.6	5	3.00
	Total cost of General Medical Report			$18.00

We are unable to relate Code 9036 of the old Relative Value Study to the Second Edition dated June, 1965. We would, therefore, like to propose we continue to pay for reports from records at the old established rate or as follows:

Code	Nomenclature	Units	Cost Per Unit	Fee
	Written Short Form Report (From Records with no Examination)	1	5	$ 5.00

Code	Nomenclature	Units	Cost Per Unit	Fee
	Narrative Summary or Medical Abstract (From Records with no Exam.)	2	5	$10.00

May we hear from you as to the recommended procedure for bringing our fee schedule up to date. Will it be necessary to meet with the Council or may our proposed updating be submitted for their approval?

Thank you for your recommendations on this matter.

Very truly yours,
Ben F. Hins
State Director
Vocational Rehabilitation

Dr. Tieszen moved that the enclosed proposal be accepted with a change substituting code 9008 with 4 units at $5.00 per point to replace 9006; seconded by Dr. Hohm, and carried.

Mr. Erickson was directed to write to Mr. Hins of the Vocational Rehabilitation Department to accept the recommendations with the one change.

Mr. Erickson discussed the letter from the State Health Department concerning the water pollution problem. Dr. Hohm moved that Dr. Bartron give them a reply. Seconded by Dr. Leigh and carried.

The following resolution was presented by the 4th District:

"Be it resolved that the Fourth District Medical Society feels that the State Medical Headquarters should be located in Pierre, South Dakota, where State and Federal Health Agencies are located, thereby facilitating the coordination of these agencies."

Dr. Leigh moved that the resolution be referred to the Commission on Internal Affairs, motion seconded by Dr. Hohm and carried.

The meeting adjourned at 12:15 p.m.

THE SECOND COUNCIL MEETING
The Plains Motel, Huron, South Dakota
May 23, 1966

J. T. Elston, M.D., chairman of the Council, called the meeting to order at 10:15 p.m.

Roll call was taken by Richard C. Erickson, executive secretary. Those present were doctors Preston P. Brogdon, John J. Stransky, John T. Elston, A. P. Reding, Paul H. Hohm, E. J. Perry, G. Robert Bartron, Fred Leigh, Harvard Lewis, E. T. Lietzke, Clark Johnson, and Harold Lowe.

Commission Chairman present was G. W. Knabe, Jr., M.D.

Dr. Perry moved we dispense with the reading of the minutes of the previous meeting. Motion seconded by Dr. Hohm and carried.

OLD BUSINESS

Mr. Erickson discussed the possibility of adding on to the medical association building. Dr. Hohm moved that the association wait until contract negotiations have been completed and not to rush into anything at the present time; that our executive committee be so instructed. Motion was seconded by Dr. Stransky and carried.

NEW BUSINESS

Dr. Perry nominated Dr. E. T. Lietzke for chairman of the Council. Dr. Hohm moved that nominations cease and a unanimous ballot be cast for Dr. Lietzke. Motion was seconded by Dr. Leigh and carried.

Dr. Elston stated that the 9th District Medical Society delegates would prefer to go back to their District and recommend a physician to fill the position of Councilor of the 9th District and then report back to the Council.

Mr. Erickson discussed the next Council meeting. It was decided to wait until a definite date has been set for the Medical-Legal meeting to be held in Rapid City and to proceed from there.

The meeting adjourned upon motion at 10:30 p.m.

FIRST HOUSE OF DELEGATES MEETING
MAY 21, 1966
THE INN MOTOR HOTEL, HURON, SOUTH DAKOTA

The meeting was called to order at 1:30 P.M. by James P. Steele, M.D., Speaker of the House.

Roll call was taken by Executive Secretary Richard Erickson. Present were Doctors Paul Hohm, Preston Brogdon, John Stransky, A. P. Reding, James P. Steele, R. H. Quinn, E. J. Perry, G. Robert Bartron, M. C. Tank, A. J. Tieszen, Fred Leigh, Harvard Lewis, E. T. Lietzke, Clark Johnson, J. T. Elston, H. E. Lowe, E. A. Johnson, G. J. Bloemendaal, Paul Bunker, G. E. Tracy, P. S. Nelson, D. L. Scheller, J. A. Muggly, B. O. Lindbloom, R. J. Zakahi, David Buchanan, Ted Hohm, Richard G. Gere, Judson O. Mabee, J. B. Gregg, J. S. Devick, D. L. Ensberg, B. J. Begley, Russell Greenfield, P. K. Aspaas, R. J. Foley, George Knabe, F. J. Gilbert, P. Dzintars, George Angelos, M. A. Marousek, David Studenberg, L. W. Keller, and B. C. Gerber. A quorum was declared present.

Inasmuch as the minutes of the previous meeting had been published in the **South Dakota Journal of Medicine,** John B. Gregg, M.D. moved to dispense with the reading of the minutes. The motion was seconded by M. C. Tank, M.D., and carried.

Dr. James Steele read the list of physicians appointed to serve on the Reference Committees. They are as follows:

Credentials Committee
Preston Brogdon, M.D., Chairman
Ted Hohm, M.D.
G. E. Tracy, M.D.

Reference Committee on Reports of Officers and Councilors
R. J. Foley, M.D., Chairman
M. C. Tank, M.D.
E. T. Lietzke, M.D.

Reference Committee on Resolutions and Memorials
J. A. Muggly, M.D., Chairman
L. G. Behan, M.D.
B. O. Lindbloom, M.D.

Reference Committee on Reports of the Commissions on Medical Service, Communications & Allied Organizations
C. F. Johnson, M.D., Chairman
J. B. Gregg, M.D.
J. S. Devick, M.D.

Reference Committee on Reports of the Commissions on Scientific Medicine, Internal Affairs, Legislation and Governmental Relations
R. H. Quinn, M.D., Chairman
E. J. Perry, M.D.
Paul Dzintars, M.D.

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Reference Committee on Reports of Special Committees and Miscellaneous Business

Fred Leigh, M.D., Chairman
G. Robert Bartron, M.D.
B. J. Begley, M.D.

Nominating Committee

District	1	Paul Bunker, M.D.
District	2	Parry Nelson, M.D.
District	3	D. L. Scheller, M.D.
District	4	R. J. Zakahi, M.D.
District	5	D. J. Buchanan, M.D.
District	6	Judson Mabee, M.D.
District	7	D. L. Ensberg, M.D.
District	8	G. W. Knabe, Jr., M.D.
District	9	J. T. Elston, M.D.
District	10	David Studenberg, M.D.
District	11	H. E. Lowe, M.D.
District	12	L. W. Keller, M.D.

Inasmuch as the reports of the President, President-elect, Vice President, Secretary-Treasurer, Delegate and Alternate Delegate to the American Medical Association, Executive Secretary, Councilors, Executive Committee, and Chairman of the Council had been published in the Delegate's Handbook, it was moved by G. Robert Bartron, M.D. to dispense with the reading of these reports. The motion was seconded by G. E. Tracy, M.D., and carried.

Dr. James Steele called for resolutions from the floor. None were presented.

Dr. James Steele read Resolution #1, presented by the Council of the South Dakota State Medical Association.

RESOLUTION #1 — Presented By: Council, South Dakota State Medical Association.

RESOLVED, That the South Dakota State Medical Association lend financial support to SoDaPAC for **educational activities** and **administrative expense:** Such support shall be in the amount of $500.00 for the year 1966-67, and that future donations be made at the discretion of the Council of South Dakota State Medical Association.

BE IT FURTHER RESOLVED, That such monies **shall not** be used by SoDaPAC for Candidate support.

Dr. James Steele referred Resolution #1 to the Reference Committee on Reports of Special Committees and Miscellaneous Business for further study.

Dr. James Steele read Resolution #2, presented by the Council of the South Dakota State Medical Association.

RESOLUTION #2 — Presented By: Council, South Dakota State Medical Association.

RESOLVED, That the Council of the South Dakota State Medical Association be authorized to appoint the members to the Board of Directors of SoDaPAC, annually, according to the By-Laws of that organization.

He referred it to the Reference Committee on Reports of Special Committees and Miscellaneous Business for further study.

Resolution #3, pertaining to SoDaPAC-AMPAC dues was read by Dr. James Steele.

RESOLUTION #3 — SoDaPAC-AMPAC Membership Dues.

Whereas, the American Medical Association founded the American Medical Political Action Committee (AMPAC) by official action in 1961, to give physicians a more effective voice in politics; and

Whereas, the South Dakota Medical Association has approved the establishment of the South Dakota Medical Political Action Committee (SoDaPAC) as an independent, unincorporated, non-profit, voluntary and bi-partisan body; and

Whereas, both AMPAC and SoDaPAC have worked diligently in the fields of political education and support of political campaigns; and

Whereas, both organizations vitally need the support of the medical profession in order to continue and to strengthen the effectiveness of their activities; therefore be it

RESOLVED, That the South Dakota Medical Association does hereby reaffirm its approval of AMPAC and SoDaPAC; and be it

RESOLVED further, That the House of Delegates of the South Dakota Medical Association does hereby recommend to its component societies (medical) that they include a separate dues statement for SoDaPAC-AMPAC of $20.00 (twenty dollars) in their annual dues statement beginning with the dues statements for the year 1966; any additional expenses incurred as a result of this action are to be assumed by SoDaPAC; and be it

RESOLVED further, That a copy of this resolution be sent to the treasurer of each of the component societies.

This resolution was referred to the Reference Committee on Reports of Commissions on Scientific Medicine, Internal Affairs, Legislation and Governmental Relations.

Resolution #4 from the First District Medical Society was read by Dr. James Steele.

RESOLUTION #4
FROM THE FIRST DISTRICT MEDICAL SOCIETY
TO THE
HOUSE OF DELEGATES OF THE STATE
MEDICAL SOCIETY OF SOUTH DAKOTA

RESOLVED: The First District Medical Society strongly recommends that the South Dakota State Medical Association make available information to be dispensed from physician members offices in regard to patient education in reference to Medicare.

Dr. Steele then referred the resolution to the Reference Committee on Reports of Special Committees and Miscellaneous Business for further study.

Dr. James Steele read Resolution #7 from the Seventh District Medical Society.

RESOLUTION #7
SUBMITTED BY THE SEVENTH DISTRICT
MEDICAL SOCIETY

WHEREAS, the concept of utilization committees is new, and many imponderables exist at present, and

WHEREAS, the establishment of a rigid form for use by utilization committees requires much careful consideration, particularly in view of the Federal government's penchant for bureaucratic, redundant, and audit type procedures, and

WHEREAS, wisdom should be used to evolve a relevant, brief, workable, non-cumbersome guideline; therefore be it

RESOLVED, that the Seventh District Medical Society finds the recently circulated guideline for utilization review committees unacceptable in its present form; and further be it

RESOLVED, that the Delegates of the Seventh District be instructed to present the above resolution to the South Dakota State Medical Association House of Delegates meeting this month (May, 1966) in Huron for concurrent action.

Resolution #7 was referred to the Reference Committee in Reports of the Commissions on Medical Service, Communications and Allied Organizations for further study.

Resolution #8 from the Seventh District Medical Society was read by Dr. James Steele.

RESOLUTION #8
SUBMITTED BY THE SEVENTH DISTRICT
MEDICAL SOCIETY

WHEREAS, an acute shortage of registered nurses, licensed practical nurses, and allied nursing personnel exists in South Dakota and the United States, and

WHEREAS, such shortage is substantially due to the high cost of training such personnel, and

WHEREAS, adequate numbers of such personnel is necessary for the operation of medical hospitals and for providing of proper medical care for the health and welfare of the people, and

WHEREAS, MEDICARE and other allied proposed programs by our government will further increase the need for such personnel, and

WHEREAS, qualified candidates desiring training in the nursing field cannot meet this high cost of training and are denied such training, and

WHEREAS, the state and federal governments have announced their desire to financially support such training; therefore be it

RESOLVED, by the Seventh District Medical Society that the State Medical Association, South Dakota, instruct its proper commission or component to recognize said medical nursing personnel shortage with the resulting problems, study same, and initiate efforts to solicit proper state and federal funds to subsidize and enlarge existing training facilities hoping thereby to secure an adequate supply of properly trained nursing personnel.

This resolution passed by the membership of the Seventh District Medical Society, Tuesday, May 3, 1966.

Dr. Steele then referred it to the Reference Committee on the Reports of the Commissions on Medical Service, Communications and Allied Organizations for further study.

The Third District Medical Society submitted the name of J. R. Westaby, M.D., for Life Membership in the South Dakota State Medical Association. Dr. Myron Tank moved that such membership be awarded Dr. Westaby. The motion was seconded by Dr. Muggly. Following a brief history of Dr. Westaby's practice and membership in the State Association by Dr. Muggly, Dr. James Steele called for the vote, asking that the House of Delegates approve the Life Membership, with a vote of thanks to Dr. Muggly for his remarks and a vote of thanks to Dr. Westaby for his contribution to the practice of medicine. The motion was passed.

Dr. James Steele made the following assignments in the Delegate's Handbook to the Reference Committees for their study:

The reports on pages 1-36 were referred to the Reference Committee on Reports of Officers and Councilors.

The reports on pages 37-40 were referred to the Reference Committee on Reports of the Commissions on Medical Service, Communications and Allied Organizations.

The reports on pages 41-49 were referred to the Reference Committee on Reports of Commissions on Scientific Medicine, Internal Affairs, and Legislation and Governmental Relations.

The reports on pages 50-52 were referred to the Reference Committee on Reports of Special Committees and Miscellaneous Business.

Dr. James Steele made several announcements concerning coming meetings and events to be held in conjunction with the Annual Meeting.

The meeting was adjourned on motion duly made and seconded.

SECOND HOUSE OF DELEGATES MEETING

The Inn Motor Hotel

May 22, 1966 **Huron, South Dakota**

The meeting was called to order at 1:30 P.M. by James P. Steele, M.D., Speaker of the House.

Executive Secretary Richard Erickson read the roll call. Present were Doctors Paul Hohm, Preston Brogdon, John Stransky, A. P. Reding, James P. Steele, R. H. Quinn, E. J. Perry, G. Robert Bartron, M. C. Tank, A. J. Tieszen, Fred Leigh, Harvard Lewis, E. T. Lietzke, Clark Johnson, John T. Elston, H. E. Lowe, E. A. Johnson, G. J. Bloemendaal, B. C. Gerber, Paul Bunker, G. E. Tracy, P. S. Nelson, D. L. Scheller, H. R. Wold, B. O. Lindbloom, R. J. Zakahi, David Buchanan, Ted Hohm, Richard G. Gere, Judson O. Mabee, J. B. Gregg, J. S. Devick, D. L. Ensberg, B. J. Begley, Russell Greenfield, T. R. Anderson, R. J. Foley, George Knabe, Jr.; M. A. Marousek, F. J. Gilbert, P. Dzintars, George Angelos, and David Studenberg. A quorum was declared present.

Dr. James Steele introduced Mr. George Bender of Parke, Davis and Company who presented a set of four pharmacy prints to the South Dakota State Medical Association. Mr. Richard C. Erickson, Executive Secretary, accepted the prints on behalf of the Association.

Dr. David Buchanan, Chairman of the Nominating Committee, read the following report:

The Nominating Committee met at 4:00 P. M. Saturday, May 21st. The following members were present for roll call: Drs. Bunker, Parry Nelson, Scheller, Zakahi, Buchanan, Mabee, Ensberg, Knabe, Elston, Studenberg, Lowe, and Keller.

The following recommendations are made for Councilor for 3-year terms:

3rd District	J. A. Muggly, M.D.
5th District	Fred Leigh, M.D.
6th District	Harvard Lewis, M.D.
7th District	E. T. Lietzke, M.D.

The following recommendations are made for officers of the Association:

President — Preston Brogdon, M.D.
President-Elect — John J. Stransky, M.D.
Vice President — E. A. Johnson, M.D.
Speaker of the House — James P. Steele, M.D.
AMA Delegate — A. P. Reding, M.D.
Alternate Delegate — Robert Quinn, M.D.

The following recommendation is made for a one-year term as Councilor from the 12th District to replace Dr. E. A. Johnson: L. W. Keller, M.D.

The Nominating Committee recommends that Mitchell be selected as the site for the 1969 convention. In addition, it is recommended that the site for the 1967 meeting (Rapid City) be reversed with that of 1968 (Aberdeen) if the bond issue in Rapid City for a new convention center passes. Otherwise the sites will remain as originally scheduled.

Mr. Speaker, the Committee recommends the adoption of this report.

Dr. E. J. Perry moved the acceptance of this report. Seconded by Dr. Tieszen and carried.

Dr. Perry moved that nominations for President be closed and that a unanimous ballot be cast for Dr. Brogdon for President. The motion was seconded by Dr. Tank and carried.

Dr. Scheller moved that nominations cease for the office of President-Elect, and that a unanimous ballot be cast for Dr. Stransky. Dr. Perry seconded the motion and it was carried.

For the office of Vice-President, Dr. Fred Leigh nominated Dr. John Elston. Dr. Perry moved that nominations cease and the ballot be cast. On a written ballot, Dr. Elston was elected to the office of Vice President.

For Speaker of the House, Dr. Bartron moved that nominations cease and a unanimous ballot be cast for Dr. James P. Steele. The motion was seconded by Dr. Tank, and carried.

Dr. Foley moved that nominations for Delegate to the AMA cease, and that a unanimous ballot be cast for Dr. A. P. Reding. The motion was seconded by Dr. Tank, and carried.

For the office of Alternate Delegate to the AMA, Dr. Tank moved that nominations cease and a unanimous ballot be cast for Dr. Quinn. The motion was seconded by Dr. Perry, and carried.

Dr. James P. Steele administered the Presidential Oath of Office to P. Preston Brogdon, M.D.

Discussion followed on the sites of the 1967, 1968, and 1969 Annual Meetings. Dr. Brogdon moved the acceptance of the Nominating Committee's report regarding this matter. The motion was seconded by Dr. Parry Nelson and carried.

Dr. T. R. Anderson moved to dispense with the reading of the minutes of the First House of Delegates Meeting. The motion was seconded and carried.

Dr. P. P. Brogdon, Chairman of the Reference Committee on Credentials read the report of that committee.

REPORT OF THE REFERENCE COMMITTEE ON CREDENTIALS

The credentials of the Delegates to the South Dakota State Medical Association were checked and the following delegates, alternate delegates, officers and councilors were present: Drs. Paul Hohm, Preston Brogdon, John Stransky, A. P. Reding, James P. Steele, R. H. Quinn, E. J. Perry, G. Robert Bartron, M. C. Tank, A. J. Tieszen, Fred Leigh, Harvard Lewis, E. T. Lietzke, Clark Johnson, J. T. Elston, H. E. Lowe, E. A. Johnson, G. J. Bloemendaal, Paul Bunker, B. C. Gerber, G. E. Tracy, P. S. Nelson, D. L. Scheller, J. A. Muggly, B. O. Lindbloom, R. J. Zakahi, David Buchanan, Ted Hohm, Richard G. Gere, Judson O.

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Mabee, J. B. Gregg, J. S. Devick, D. L. Ensberg, B. J. Begley, Russell Greenfield, P. K. Aspaas, R. J. Foley, George Knabe, Jr.; F. J. Gilbert, Paul Dzintars, George Angelos, M. A. Marousek, David Studenberg, and L. W. Keller.

The Committee on Credentials recommends that delegates be seated on the basis of one (1) delegate per twenty (20), or fraction thereof, of members in each district who are in good standing.

Further, it is noted by the Committee on Credentials that the number of Delegates from the Ninth District be reduced to four (4) as the Ninth District lists only 63 members in good standing from a total District membership of 98.

A quorum was present for the meeting of the House of Delegates and the credentials of those in attendance were in order.

Total registration for the convention is 409; including 184 physicians, 41 guests, 78 exhibitors, and 106 Auxiliary members.

Respectfully submitted,
REFERENCE COMMITTEE ON CREDENTIALS
Preston Brogdon, M.D.

The only correction was the addition of Dr. B. C. Gerber to the list of delegates present. Dr. Brogdon moved the acceptance of the report as corrected. The motion was seconded by Dr. Tracy and carried.

Dr. R. J. Foley, Chairman of the Reference Committee on Reports of Officers and Councilors, read the following report:

REPORT OF THE REFERENCE COMMITTEE ON REPORTS OF OFFICERS AND COUNCILORS

The report of the President was studied and reviewed, and the Committee wishes to commend the President for an excellent year. A special note was taken of the number of visitations and meetings he attended throughout the year.

The Committee considered the reports of the President-Elect, Vice President, and Secretary-Treasurer.

The report of the Delegate and Alternate Delegate to the AMA was reviewed. The Committee would like to give special recognition to them for their diligence in performance of their duties in behalf of the State Society.

The report of the Speaker of the House was reviewed. The Committee suggested that the current practice of naming the Reference Committee Chairmen and Committee members in advance be continued.

The reports of the Councilor-at-Large and Executive Committee were reviewed.

The report of the Executive Secretary was considered and was found satisfactory. The Committee took special note of the great number of meetings attended and the vast number of miles traveled throughout the year. It was suggested that the Executive Secretary be commended for his excellent work on the State Legislative level. The Committee was pleased to note that a surplus has developed in the **South Dakota Journal of Medicine.** It was heartily recommended that all the members of the Society read the summary of the Executive Secretary's report.

The reports of the Councilors of the various Districts were reviewed and found satisfactory. However, it was noted that the Northwest District had only one meeting. The Committee suggests that the District have more scheduled meetings to keep abreast of the functions and activities of the State Society.

The report of the Chairman of the Council was considered and found satisfactory.

The Committee recommends the acceptance of the report as a whole, and I so move.

Respectfully submitted,
REFERENCE COMMITTEE ON REPORTS OF OFFICERS AND COUNCILORS
R. J. Foley, M.D., Chairman

Dr. Foley moved the acceptance of this report. The motion was seconded by Dr. G. Robert Bartron, and carried.

Dr. B. O. Lindbloom, Chairman of the Committee on Resolutions and Memorials, read the following report:

REPORT OF THE REFERENCE COMMITTEE ON RESOLUTIONS AND MEMORIALS

WHEREAS, the Huron District Medical Society and the Ladies Auxiliary members have been so thorough in making arrangements for the success of the combined meeting on our 85th Anniversary,

BE IT RESOLVED, that the South Dakota State Medical Association give its voice in appreciation and thanks to the local physicians of Huron and their wives.

WHEREAS, the management of The Inn Motor Hotel and the Plains Motel have been so cooperative in providing facilities for the success of the 85th Anniversary meeting of the South Dakota State Medical Association,

BE IT RESOLVED, that the South Dakota State Medical Association extend its thanks and appreciation to The Inn Motor Hotel and the Plains Motel.

WHEREAS, the Chamber of Commerce has provided excellent service in making it possible for the success of the working arrangements,

BE IT RESOLVED, that the South Dakota State Medical Association extend its thanks and appreciation to the Huron Chamber of Commerce.

WHEREAS, the Huronite Daily Plainsman and KIJV radio station have been most cooperative in presenting the public news of the 85th annual meeting of the South Dakota State Medical Association,

BE IT RESOLVED, that the South Dakota State Medical Association extend its thanks to the Huronite Daily Plainsman, and KIJV radio station.

WHEREAS, the Huron Country Club of Huron has provided facilities for the Stag Party contributing much to the success of the meeting and entertainment,

BE IT RESOLVED, that the South Dakota State Medical Association extend its thanks to the Huron Country Club.

WHEREAS, the Colonial Bakery of Huron has provided facilities for a noon luncheon contributing much to the success of the meeting,

BE IT RESOLVED, that the South Dakota State Medical Association extend its thanks to the Colonial Bakery of Huron.

WHEREAS, the management of the State Fair Grounds has provided facilities for the general sessions of our 85th annual meeting and contributed greatly to the success of our convention,

BE IT RESOLVED, that the South Dakota State Medical Association extend its thanks to the management of the State Fair Grounds.

The Reference Committee also recommends that $50.00 be donated to the South Dakota State Medical School Endowment Association for each of the five physicians who passed away during the past year and are listed in the Handbook, as a memorial to them.

Respectfully submitted,
REFERENCE COMMITTEE ON RESOLUTIONS AND MEMORIALS
B. O. Lindbloom, M.D.,
Committee Member

Dr. Tank moved the acceptance of this report. The motion was seconded by Dr. G. Robert Bartron, and carried.

In the absence of Dr. Clark Johnson, Dr. John B. Gregg read the report of the Reference Committee on Commissions on Medical Service, Communications and Allied Organizations.

REPORT OF THE REFERENCE COMMITTEE ON COMMISSIONS ON MEDICAL SERVICE, COMMUNICATIONS AND ALLIED ORGANIZATIONS

The Reference Committee reviewed the Report of the Commission on Medical Service, which included:

1. A uniform physical examination form for all state schools and private schools of higher learning.
2. The vaccination-aid program to be endorsed by the South Dakota State Medical Association. This program is to be encouraged through the pa-

tient's private physician.

3. The recommendation was made to perfect a uniform, or standardized, physical examination form for high school athletics.

Dr. J. B. Gregg moved the acceptance of the report of the Commission on Medical Service. The motion was seconded by Dr. Devick and carried.

Following review by the Reference Committee, Dr. John B. Gregg moved the acceptance of the report of the Commission on Liaison with Allied Organizations. The motion was seconded by Dr. Devick, and carried.

Respectfully submitted,
REFERENCE COMMITTEE ON
COMMISSIONS ON MEDICAL
SERVICE, COMMUNICATIONS
AND ALLIED ORGANIZATIONS
Clark Johnson, M.D., Chairman

Dr. E. J. Perry moved that the House of Delegates consider the resolutions, as studied by the Reference Committee on Commissions on Medical Service, Communications and Allied Organizations, individually. The motion was seconded by Dr. Quinn, and carried.

The Committee recommended that Resolution #7 be tabled. (See Minutes of the First House of Delegates meeting, with the following explanatory note: "Because of the fact that the 'rigid form' referred to in the second paragraph is to be used only as a guideline for use by utilization committees, it was the opinion of the Reference Committee that no action would be necessary on Resolution #7. Each hospital staff can set up their own check-list form as they prefer. This Committee recommends the tabling of this resolution.") Dr. Fred Leigh moved that this resolution be tabled. The motion was seconded by Dr. Tracy, and carried.

The Committee recommended that Resolution #8 submitted by the Seventh District Medical Society be changed to read as follows:

RESOLUTION NUMBER EIGHT

WHEREAS, an acute shortage of registered nurses, licensed practical nurses, and allied nursing personnel, along with other para-medical help such as medical technologists, X-ray technicians, etc. exists in South Dakota and the United States, and

WHEREAS, such shortage is substantially due to the high cost of training such personnel, and

WHEREAS, adequate numbers of such personnel are necessary for the operation of medical hospitals and for providing of proper medical care for the health and welfare of the people, and

WHEREAS, Medicare and other allied proposed programs by our government will further increase the need for such personnel, and

WHEREAS, qualified candidates desiring training in the nursing and para-medical fields cannot meet this high cost of training and are denied such training, and

WHEREAS, the state and federal governments have announced their desire to financially support such training; therefore be it

RESOLVED, by the Seventh District Medical Society that the State Medical Association, South Dakota, instruct its proper commission or component to recognize said para-medical personnel shortage with the resulting problems, study same, and initiate efforts to solicit proper state and federal funds to subsidize and enlarge existing training facilities hoping thereby to secure an adequate supply of properly trained para-medical personnel.

The Reference Committee feels it is the intent of this resolution to stimulate financial help for 3-year nursing diploma schools and allied para-medical schools in order that they may receive federal or state funds for training and attracting individuals into the above fields.

The Reference Committee further feels that the Medical Service Commission should pursue this resolution in order to support diploma schools of nursing and other para-medical schools. The Committee would also like to bring the contents of this resolution to the attention of our Congressmen and, specifically, Senators Mundt and McGovern.

The Committee recommended that Resolution #8 be referred to the Commission on Medical Service for further action. Dr. Tracy moved the adoption of this portion of the Committee's report. The motion was seconded by Dr. Devick, and carried.

Dr. Quinn moved the acceptance of the report, in toto, as amended. The motion was seconded by Dr. David Buchanan, and carried.

Dr. Robert Quinn, Chairman of the Reference Committee on Reports of the Commissions on Scientific Medicine, Internal Affairs, and Legislation and Governmental Relations, read their report.

REPORT OF THE REFERENCE COMMITTEE ON REPORTS OF THE COMMISSIONS ON SCIENTIFIC MEDICINE, INTERNAL AFFAIRS, AND LEGISLATION AND GOVERNMENTAL RELATIONS

REPORT OF THE COMMISSION ON SCIENTIFIC MEDICINE

1. Mental Health: The reference committee recommends acceptance of this portion of the report.
2. Mental Retardation: The reference committee recommends acceptance of this portion of the report.
3. Tuberculosis: The reference committee strongly recommends that a meeting be held including representatives of the State Health Department, State Medical Association, Commission on Scientific Medicine, and the newly appointed United States Public Health Officer as soon as he arrives. The committee recommends acceptance of this portion of the report with the above addition.
4. Aging: Reference Committee recommends acceptance of this portion of the report.
5. Heart Disease: The reference committee recommends we continue to keep close liaison with this steering committee. Also recommends that more than one physician representative from the State Medical Association, preferably three: one from the Scientific Medicine Commission, one from the Medical Service Commission and one from the Legislative and Governmental Relations Commission be recommended to the steering committee.

Dr. Nelson moved to accept the paragraph pertaining to Heart Disease in the Committee's report. The motion was seconded by Dr. Reding. Dr. Paul Hohm moved that the recommendation be amended to read: "The reference committee recommends we continue to keep close liaison with this steering committee. Also recommends more than one physician representative be appointed from the State Medical Association, preferably three." The amendment was seconded by Dr. Nelson. Dr. Knabe moved that the amendment be amended to include the phrase: "preferably one representative from each Commission." Dr. Knabe's motion to amend the amendment was seconded by Dr. Nelson and carried. The amended amendment was voted on and passed. The original motion, as amended, was passed.

6. Other Programs: The reference committee recommends that we commend S. W. Fox, M.D., and C. F. Johnson, M.D. for their work in the areas of diabetes and anti-venereal disease.
7. Annual Meeting: The reference committee recommends a commendation be given to the Commission on Scientific Medicine for their efforts to improve the quality and calibre of the State meeting.

The reference committee recommends acceptance of this report as a whole, with the above amendments.

REPORT OF THE COMMISSION ON INTERNAL AFFAIRS

The reference committee recommends the acceptance of the first three paragraphs of the Commission's report. It was the decision of the Reference Committee that it was not in the best interest of the Association to exclude the Councilors and Officers of the State Association as voting members of the House of Delegates. Therefore, the Committee recommends not accepting the fourth (4th) paragraph of the Commis-

UNIVERSITY OF MARYLAND

sion's report. So moved by Dr. Robert Quinn, seconded by Dr. Tank, and carried.

The reference committee recommends that paragraph five (5) relating to the certification of delegates be allowed to be in action for several years, then if inequities seem to appear in representation, paragraph four (4) may be reconsidered. Only one person appeared before this committee in regard to this question. Dr. Quinn moved the acceptance of this portion of the report. The motion was seconded by Dr. Tracy, and carried.

The reference committee recommends acceptance of paragraph six (6) concerning the Speaker of the House of Delegates appointing all reference committees of the House of Delegates and notifying the appointees in writing not less than thirty days prior to the date of the annual meeting. On motion, the recommendation was accepted.

The reference committee recommends not accepting paragraph seven (7) concerning the change in By-Laws. On motion duly made and seconded, the recommendation was accepted.

The reference committee recommends the acceptance of paragraph eight (8), changing the word "doctor" to "physician."

The reference committee recommends acceptance of paragraph nine (9) concerning the central billing system.

BENEVOLENT FUND FINANCIAL STATEMENT

The reference committee recommends acceptance of this portion of the report.

OBITUARY RECORD REPORT

The reference committee recommends acceptance of this portion of the report with the addition of: S. A. Donahoe, M.D., Sioux Falls; R. C. McCroskey, M.D., Rapid City; R. B. Fleeger, M.D., Lead; and L. A. Haug, M.D., Beresford.

BUDGET COMMITTEE

The reference committee recommends acceptance of this portion of the report. Dr. Quinn moved the acceptance of the Budget. The motion was seconded by Dr. David Buchanan and carried.

The reference committee recommends acceptance of this Commission report as a whole with the amendments. Dr. T. R. Anderson moved the acceptance of this Commission report. The motion was seconded by Dr. Bunker and carried.

RESOLUTION #3 — SoDaPAC-AMPAC Membership Dues

The reference committee strongly recommends acceptance of this report in order to help further medicine's position in the political field and to defend the practice of medicine as best we can under the circumstances. Dr. Quinn moved the acceptance of Resolution #3. Seconded by Dr. Lowe and carried.

COMMISSION ON LEGISLATION AND GOVERNMENTAL RELATIONS

The reference committee has considered this report and recommends its acceptance as a whole.

Dr. E. J. Perry moved to amend the report of the Reference Committee on Resolutions and Memorials to include the names of four additional physicians: S. A. Donahoe, M.D., Sioux Falls; R. C. McCroskey, M.D., Rapid City; R. B. Fleeger, M.D., Lead; and L. H. Haug, M.D., Beresford. The motion was seconded by Dr. Tank and carried.

Dr. F. D. Leigh read the report of the Reference Committee on the Reports of Special Committees and Miscellaneous Business.

REPORT OF THE REFERENCE COMMITTEE ON REPORTS OF SPECIAL COMMITTEES AND MISCELLANEOUS BUSINESS

The Reference Committee considered the report of the Grievance Committee and recommends the acceptance of the report as printed in the Handbook.

The Reference Committee considered the report of the State Utilization and Insurance Review Committee. The Reference Committee recommends the acceptance of this report.

The Reference Committee considered Resolution #1, concerning financial support of SoDaPAC by the South Dakota State Medical Association.

RESOLUTION #1 — Presented By: Council, South Dakota State Medical Association.

RESOLVED, That the South Dakota State Medical Association lend financial support to SoDaPAC for **educational activities** and administrative expense: Such support shall be in the amount of $500.00 for the year 1966-67, and that future donations be made at the discretion of the Council of South Dakota State Medical Association.

BE IT FURTHER RESOLVED, That such monies **shall not** be used by SoDaPAC for Candidate support.

The committee recommends adoption of this resolution. Dr. Leigh moved the adoption of the resolution. The motion was seconded by Dr. Tracy. A standing vote was called and resulted in 30 ayes, and 11 nays. District 1 asked that the record indicate they cast a nay vote.

The Reference Committee considered Resolution #2, concerning appointment of the SoDaPAC Board of Directors by the Council of the South Dakota State Medical Association.

RESOLUTION #2 — Presented By: Council, South Dakota State Medical Association.

RESOLVED, That the Council of the South Dakota State Medical Association be authorized to appoint the members to the Board of Directors of SoDaPAC, annually, according to the By-Laws of that organization.

The committee recommends the adoption of this resolution. Dr. Leigh so moved. The motion was seconded by Dr. Tracy. A standing vote was taken with the result being 30 aye votes, and 11 nay votes. Districts 1, 4, 10, and 12, voted nay.

The Reference Committee considered Resolution #4, concerning patient education in reference to Medicare. The Reference Committee recommends that action on this resolution be deferred at this time for the reasons that final directives of the Social Security Administration on Titles 18 and 19 have not been resolved and information disseminated at this time might be premature and misleading.

RESOLUTION #4 — FROM THE FIRST DISTRICT MEDICAL SOCIETY TO THE HOUSE OF DELEGATES OF THE STATE MEDICAL SOCIETY OF SOUTH DAKOTA.

RESOLVED: The First District Medical Society strongly recommends that the South Dakota State Medical Association make available information to be dispensed from physician members' offices in regard to patient education in reference to Medicare.

The committee recommends that action on this resolution be deferred at this time. Dr. Leigh moved adoption of this portion of the report. The motion was seconded by Dr. Tank. A standing vote resulted in 31 ayes, and 7 nays.

Respectfully submitted,
REFERENCE COMMITTEE ON REPORTS OF SPECIAL COMMITTEES AND MISCELLANEOUS BUSINESS
Fred D. Leigh, M.D., Chairman

Dr. Leigh moved acceptance of this report as a whole, as amended. The motion was seconded by Dr. Buchanan and carried.

Mr. Erickson introduced Mr. Dallas Whaley, Field Representative from the American Medical Association; Mr. Robert Ethridge of the Department of Religion of the American Medical Association; and Mrs. Wendell R. Roller, National Representative from the Women's Auxiliary to the American Medical Association.

Dr. Steele asked that the House of Delegates cast a unanimous vote to introduce two items of new business. Motion was duly seconded and carried.

Mr. Erickson discussed a request which had been made by the Board of Regents, through Dr. Clark Johnson, for endorsement by the South Dakota State Medical Association of a proposal for the erection

of a building on the campus of the South Dakota State University at Brookings to house the School of Nursing. Dr. Tank moved the adoption of a resolution stating such endorsement. The motion was seconded by Dr. Leigh and carried.

Dr. Steele asked for a motion from the floor to extend a rising vote of thanks to Dr. Myron Tank in recognition of his ten years of service to the House of Delegates from the Third District Medical Society. It was so moved by Dr. Quinn, seconded by Dr. Reding, and carried.

Following announcements regarding upcoming events in conjunction with the Annual Meeting, Dr. Steele voiced his appreciation to all those involved in making the House of Delegates meetings a success.

Dr. Tracy moved that the meeting be adjourned. The motion was seconded by Dr. Tank and carried.

PRESIDENTIAL OATH OF OFFICE

I solemnly swear that I shall carry out the duties of the President of the South Dakota State Medical Association to the best of my ability. I shall strive constantly to maintain the ethics of the medical profession and to promote the public health and welfare. I shall dedicate myself and my office to improving health standards and to the task of bringing increasingly improved medical care to the people of South Dakota. I shall uphold the Constitution and By-Laws of the AMA and the South Dakota State Medical Association. I shall champion the cause of freedom in medical practice and freedom for all my fellow Americans.

I do solemnly swear that I will discharge the duties of this office to the best of my ability, so help me God.

MINUTES OF THE ANNUAL MEETING OF THE DIRECTORS

South Dakota Medical School Endowment Association
8:00 A.M. Sunday, May 22, 1966
The Inn Motor Hotel, Huron, South Dakota

Notice having been given that the annual meeting of the Directors of the South Dakota Medical School Endowment Association would be held at The Inn Motor Hotel, in the city of Huron, County of Beadle, State of South Dakota, on the 22nd day of May, 1966, at 8:00 o'clock a.m., and

Such notice reciting that all business as would properly come before the meeting would be transacted, including the election of officers, the financial report, investments, and the Stansbury property and the future loan program, and

Such meeting being held pursuant to call, the following directors were present: F. R. Williams, M.D.; T. H. Willcockson, M.D.; G. E. Tracy, M.D.; Warren Jones, M.D.; and E. T. Lietzke, M.D.

The following directors were absent: R. C. Jahraus, M.D. and J. A. Anderson, M.D.

Also present were James P. Steele, M.D.; J. B. Gregg, M.D.; Mr. John Zimmer and Mr. Richard C. Erickson.

Mr. Richard C. Erickson read the minutes of the previous meeting, such minutes being approved as read. The Secretary was instructed to note approval as of this date.

The next order of business was that of election of officers. Dr. Willcockson moved that the present officers be renominated for the coming year. Dr. Tracy seconded the motion. A vote was called and carried unanimously.

Mr. Erickson discussed the financial report. There being no additions or corrections, the report was approved as read.

Mr. Erickson discussed the $4,000 in Government Bonds which will come due in August of this year. Dr. Willcockson moved that we invest the money in a long term Certificate of Deposit. Motion was seconded by Dr. Lietzke and carried.

A discussion was held concerning the Stansbury property. Dr. Willcockson moved that the Stansbury property funds be kept intact for another year. Seconded by Dr. Tracy and carried.

Dr. Jones gave an oral report on funds used for loans. During the school year there have been three requests for loans, two of which were approved.

A discussion was held concerning the letter from Walter Hard, Dean, University of South Dakota, concerning the student loan information sheet.

Dr. Willcockson moved that interest rates on student loans remain the same as they have in the past. Motion was seconded by Dr. Tracy. A discussion was held, question called and motion was not carried.

Dr. Willcockson moved that the President, Vice President and Secretary have a meeting to discuss the loan program to determine the needs as they exist at this time, and report back to the Board of Directors at the next meeting. Seconded by Dr. Tracy. Question called and motion carried. Mr. Zimmer was also asked to attend the meeting.

Dr. Tracy moved that the information sheet concerning student loans be revised by the same group. Motion was seconded by Dr. Willcockson and carried.

Dr. Willcockson moved that a special meeting be called by the president after the committee has met to meet with Dean Hard on the future needs of the program. The motion was seconded by Dr. Lietzke and carried.

Dr. James P. Steele and Dr. J. B. Gregg discussed the possibility of a four-year medical school in South Dakota.

There being no other business to be transacted, the meeting, was upon motion duly made by Dr. Lietzke, seconded by Dr. Tracy and carried, adjourned.

Warren Jones, Secretary

REPORT OF THE PRESIDENT

I would like to express my sincere gratitude for the excellent cooperation given to me during my tenure of office by all the components of our State Medical Society. It is worthy of special note to again mention the tireless efforts of excellence given your President by our State Executive Office whose efficiency has been above expectancy.

The onslaught of Medicare has fallen upon us. The year has been filled with organizational and informative meetings. We, as your President and Executive Body, have kept our members informed to the best of our ability. In spite of all the chaos during the last year, it is my opinion that for the present we are in as good or better position than any other Medical Society. We fought Medicare to the last ditch, but it is now law, and we want now to keep well informed of all actions of our Federal Bureaucracy.

Our State Blue Shield has been appointed carrier for Part B under Medicare. Our State Society has organized the districts for "Review and Utilization Committees." We are in a position to help control the mechanics of the administration of Part B of Medicare, the part that will be the Doctor's responsibility.

Your President had requested of each district an invitation to visit their Society. I was able to visit each district that extended an invitation of visitation to your President. An itinerary of your President's activities is as follows:

May 22 & 23, 1965 — AMPAC Meeting in Washington, D. C.
June 20-24, 1965 — A.M.A. Meeting in New York City
July 7, 1965 — Special Blue Shield Board Meeting in Sioux Falls
August 6 & 7, 1965 — Black Hills Seminar in Rapid City
August 19-22, 1965—Meetings of State Presidents in Chicago
September 8, 1965 — Visitation to Whetstone District Medical Society, Webster
September 18-19, 1965 — Psychiatric Workshop at Omaha
October 1-3, 1965 — Special A.M.A. Meeting in Chicago, Illinois
October 6, 1965 — Visitation to Aberdeen District Medical Society, Aberdeen

October 8-9, 1965 — State Judicial Meeting, Pierre, South Dakota
October 10, 1965 — State M.A. Council & Doctor Orientation, Huron
October 12, 1965 — Visitation to Black Hills District Medical Society, Rapid City
October 13, 1965 — Visitation to Mobridge District Medical Society, Mobridge
October 14, 1965 — Visitation to Brookings District Medical Society, Madison
October 21, 1965 — Visitation to Yankton District Medical Society, Yankton
November 2, 1965 — Visitation to Watertown District Medical Society, Watertown
November 6-7, 1965 — North Central Conference, Minneapolis, Minnesota
November 18, 1965 — Organizational Meeting of Insurance and Review Committee, Sioux Falls, South Dakota
November 20-21, 1965 — V.D. Symposium, Chicago, Illinois
November 24, 1965 — Visitation to Huron District Medical Society, Huron
November 28-30, 1965 — A.M.A. Clinical Meeting, Philadelphia, Pennsylvania
December 7, 1965 — Visitation to Sioux Falls District Medical Society, Sioux Falls, South Dakota
December 8, 1965 — State Council Meeting, Sioux Falls, South Dakota
December 11, 1965 — Blue Shield Board Meeting, Sioux Falls, South Dakota
December 14, 1965 — Meeting with Welfare Commission at Pierre
December 14, 1965 — Visitation to Pierre District Medical Society, Pierre
January 5, 1966 — Meeting with Welfare Commission, Pierre, South Dakota
January 8, 1966 — State Council Meeting, Huron
January 9, 1966 — Meeting of Corporate Body of Blue Shield, Huron
January 12, 1966 — State & House Hearing on Medicare, Pierre
January 16-17, 1966 — Blue Shield Meeting of District, Des Moines, Iowa
March 2, 1966 — Visitation to Winner District Medical Society, Winner
March 5-6, 1966 — Conference on Medical Ethics, Chicago, Illinois
March 12, 1966 — Advisory Council on Heart-Cancer & Stroke, Huron
March 24, 1966 — Report on Medicare to Hospital and Nursing Homes, Huron
April 1, 1966 — Annual U.S.D. Medical School Awards Night, Sioux Falls
April 1, 1966 — Blue Shield Board of Directors, Sioux Falls, South Dakota
April 2, 1966 — State Council Meeting, Sioux Falls, South Dakota
April 12, 1966 — Report on Medicare — ANA, Huron, South Dakota
April 23, 1966 — SoDaPac Workshop Report, Sioux Falls, South Dakota

Respectfully submitted,
Paul Hohm, M.D.
President

The report of the President was studied and reviewed, and the Committee wishes to commend the President for an excellent year. A special note was taken of the number of visitations and meetings he attended throughout the year.

REPORT OF THE PRESIDENT-ELECT

As the President-Elect, I have attended all Council meetings.

I attended the AMPAC meeting in Washington, D. C. last May and the White House Conference in Washington, D. C. in November. I also attended the Conference on Medicare in Chicago, Illinois, in January.

I have been in touch with the Executive Secretary and the President and other Officers about problems, as they presented themselves throughout the year.

Respectfully submitted,
Preston Brogdon, M.D.
President-Elect

The Committee considered the report of the President-Elect and recommends the acceptance of this report.

REPORT OF THE VICE PRESIDENT

I have attended all Council meetings and meetings of the Executive Committee during the past year. I have carried out all of the duties assigned to me by the President of the State Medical Association.

Respectfully submitted,
John J. Stransky, M.D.
Vice President

The Committee has considered the report of the Vice President and recommends the acceptance of this report.

REPORT OF THE SECRETARY-TREASURER

As your officer, I have attended all Executive Committee and Council meetings during the year. The duties of this office were carried out with the assistance of our competent Executive Secretary, Richard C. Erickson, and the staff at the association office.

Respectfully submitted,
A. P. Reding, M.D.
Secretary-Treasurer

The Committee has considered the report of the Secretary-Treasurer and recommends the acceptance of this report.

REPORT OF THE DELEGATE AND ALTERNATE DELEGATE TO THE AMA

The House of Delegates of the AMA held three meetings since our last report. The annual meeting was held in New York City, June 20-24, 1965; a **special** meeting was called in Chicago, Illinois on October 2-3, 1965, and the third was held during the Clinical Session in Philadelphia, Pennsylvania, November 28 through December 1, 1965.

Your State Association was represented by your president, Paul H. Hohm, M.D.; your executive secretary, Richard C. Erickson; your delegate, A. P. Reding, M.D.; and your alternate delegate, Robert H. Quinn, M.D., at each of these meetings.

Detailed reports of the actions taken by the House of Delegates at these meetings have been published in **AMA News, JAMA,** and the **South Dakota Journal of Medicine.** Verbal reports were given by your delegate and alternate delegate at each council meeting following a national meeting. Special information has been sent out regularly to all doctors in the state by the association office.

The past year has been filled with a great deal of turmoil and confusion for the medical profession. With Medicare now a federal law there will be many changes in the practice of medicine.

Respectfully submitted,
A. P. Reding, M.D.
A.M.A. Delegate
Robert H. Quinn, M.D.
Alternate A.M.A. Delegate

The report of the Delegate and Alternate to the AMA was reviewed. The Committee would like to give special recognition to them for their diligence in performance of their duties in behalf of the State Society.

REPORT OF THE SPEAKER OF THE HOUSE

Since I have just recently been appointed Speaker of the House, there is no report other than the naming of the reference committee chairmen. The Reference Committee Chairmen appear below for the 1966 Annual Meeting.

Credentials Committee —P. P. Brogdon, M.D.
Reference Committee on
Reports of Officers and Councilors
—R. J. Foley, M.D.
Reference Committee on
Resolutions and Memorials
—J. A. Anderson, M.D.

Reference Committee on
Reports of Commissions on Medical Service, Communications, and Allied Organizations
—C. F. Johnson, M.D.
Reference Committee on
Reports of Commissions on Scientific Medicine, Internal Affairs, Legislation and Governmental Relations —R. H. Quinn, M.D.
Reference Committee on
Reports of Special Committees and Miscellaneous Business —Fred D. Leigh, M.D.

Respectfully submitted,
James P. Steele, M.D.
Speaker of the House

The report of the Speaker of the House was reviewed. The Committee suggests that the current practice of naming Reference Committee Chairmen and Committee members in advance be continued.

REPORT OF THE COUNCILOR-AT-LARGE

There have been no specific duties assigned to the Councilor-at-Large during the past year but I have endeavored to keep abreast of current happenings in the field of Medical Legislation and to provide any suggestions and help possible. The Council is to be commended on its record of activity in the past year and the effectiveness with which it has handled the affairs of the South Dakota State Medical Association.

Respectfully submitted,
James P. Steele, M.D.
Councilor-at-Large

The Committee reviewed the report of the Councilor at Large and recommends the acceptance of this report.

REPORT OF THE EXECUTIVE COMMITTEE

The Executive Committee was given the responsibility of meeting with the State Welfare Commission at Pierre, South Dakota. The meeting was held in Pierre on December 14, 1965. We felt that much was accomplished as we had opportunity to discuss the problem of Medicare as it related to the Doctors and Welfare Commission. The members again represented the State Medical Association at the House and Senate Hearings on January 12, 1966. It is noteworthy to state that our Legislature and Welfare Commission has in general proceeded as we had suggested to them.

The Executive Committee also reviewed the plans for the proposed remodeling of the State Office at Sioux Falls. They have given the Executive Director directions to proceed with the proposed plans as soon as feasible so that the changes will be completed before July 1, 1966 when Medicare will throw an additional load on our State Executive Office.

Respectfully submitted,
Paul Hohm, M.D.
President of Executive Committee

The Committee reviewed the report of the Executive Committee and recommends the acceptance of this report.

REPORT OF THE EXECUTIVE SECRETARY

During the past year, your staff has endeavored to render as many services as possible within the limits established by the Association. The scope of association affairs has continued to grow and with the advent of "Medicare," we at the headquarters office look to a very busy schedule for the year 1966-67.

Liaison With District Societies

During the year your Executive Secretary has attended as many of the District Society meetings as possible. Many were attended in conjunction with the annual visitation of the President, Dr. Paul Hohm. Total District meetings attended - 14.

Public Relations

One of the most important functions of any organization is the public relations program carried on by the staff. Your Executive Secretary represented you at ten (10) national meetings, fifteen (15) in-state meetings, thirteen (13) Blue Shield meetings. In addition, six (6) speeches were given in South Dakota during the year. A total of 30,000 miles was traveled by the Executive Secretary, with an additional 12,000 miles being covered by Mrs. Butler and Mr. Tuffs. The most important part of the Association's continuing Public Relations Program was that South Dakota physicians attended many of the national meetings at association expense.

Headquarters Building

During the year, all interest due on notes was paid, in addition to retiring $3,494.18 in principal and notes. The tax exemption case on the building is presently before the Supreme Court, and it is hoped a favorable decision will be reached in the near future. Some rearranging and structural changes in the building were necessary this year in order to accommodate the increase in personnel needed for operation of the "Medicare" program.

Commissions

Most of the Commissions met at least once during the year, and some have met on numerous occasions. Your Executive Secretary attended all of these meetings. In addition to the Commissions, a State Utilization and Insurance Review Committee was formed and has held two meetings. A vote of thanks should be given to the eighty (80) physicians who carry on this most important work of the association.

Legislation

As in the past, a great deal of time, effort, and expense was channeled in the direction of State and National Legislation. This was the "Medicare" year, and a good deal of the aforementioned was expended on public and physician information. On the state scene, sixteen (16) bills were introduced into the Legislature which directly or indirectly affected medicine in South Dakota. We were successful in having legislation passed granting immunity to hospital staff officers, and certain committees of the Association. We were also successful in killing legislation dealing with dispensing of drugs by physicians. Two bills enabling the state to proceed with the implementation of Titles 18 and 19 of the Medicare Law were also passed.

Blue Shield and Other Fiscal Programs

The fiscal programs of the Association including Blue Shield, Old Age Assistance, Medical Aid to the Aged, and Armed Services Medicare have continued their growth during the year. As of December 31, 1965, Blue Shield gained 2,183 contracts for the year. Blue Shield's income stood at $1,150,000, with claims payments of $976,882.33. OAA and MAA and Medicare added $439,840.27; thus, distributing a total of $1,416,722.60 to the physicians of South Dakota. In addition, South Dakota Blue Shield was picked as the intermediary for Federal Medicare. This operation will probably add an additional $3,000,000. annually to the operation.

Journal of Medicine

Last year, the Journal's financial condition was somewhat questionable. However, certain changes have been made in the operation and your Executive Secretary is happy to report that the **South Dakota Journal of Medicine** is in the black and that presently a surplus of approximately $2,300 is carried on the books. More and better scientific articles are the goal for the future.

Summary

This has been a rough year for medicine, as everyone knows. However, the future of medicine may well depend on nothing more than physicians' attitudes. It is my firm belief that more physicians must become **aware** of the political and legislative programs. They must now **take the time** to read the regulations, understand the programs, help make the decisions and direct the programs which vitally affect the future of medicine. Your staff can do part of it, but the final decisions **must** rest in the hands of the physicians who are willing "to make the effort." My thanks to the officers, councilors, commission chairmen, commission and committee members, and staff who make this report possible.

Respectfully submitted,
Richard C. Erickson
Executive Secretary

UNIVERSITY OF MARYLAND

The report of the Executive Secretary was considered and was found satisfactory. The Committee took special note of the great number of meetings attended and the vast number of miles traveled throughout the year. It was suggested that the Executive Secretary be commended for his excellent work on the State Legislative level. The Committee was pleased to note that a surplus has developed in the SOUTH DAKOTA JOURNAL OF MEDICINE. It was heartily recommended that all members of the Society read the summary of the Executive Secretary's report.

REPORT OF THE COUNCILOR FIRST DISTRICT

MEMBERSHIP: 55 Members

OFFICERS:

President—	Paul Leon, M.D.
Vice President—	Karlis Zvejnieks, M.D.
Secretary-Treasurer—	W. R. Taylor, M.D.
Councilor—	E. J. Perry, M.D.
Censors—	C. B. Murdy, M.D. J. A. Eckrich, M.D. E. A. Rudolph, M.D.
Delegates—	J. Bloemendaal, M.D. B. Gerber, M.D. P. Bunker, M.D.
Alternate Delegates—	R. Standard, M.D. K. Zvejnieks, M.D. A. Janusz, M.D.

The Aberdeen District Medical Society holds monthly dinner meetings on the first Wednesday of each month from September to June. The following is a list of events and speakers.

SEPTEMBER:
The program was presented by P. V. McCarthy, M.D. His presentation was titled, "The Nature of X-rays."

OCTOBER:
Paul Hohm, M.D., President of the South Dakota Medical Association visited the Aberdeen District. Mr. Richard C. Erickson, Executive Secretary of the State Society was also present. The speaker was Thomas Bunker, M.D., who presented a paper on "Otological Aspects of Head Trauma."

NOVEMBER:
A combined meeting with the Woman's Auxiliary of the District Society was held. Donald Destache, M.D., Chief of Anesthesia of St. Luke's Hospital, Aberdeen, S. Dak. spoke on "Newer Developments in Anesthesiology."

DECEMBER:
The annual election of officers and committee appointments were accomplished.

JANUARY:
W. C. Miller, M.D., Pediatrician from the Aberdeen Medical Center, spoke on "Newer Concepts of Phenylketonuria."

FEBRUARY:
A combined meeting was held with the Woman's Auxiliary. A movie entitled "A Different Drum," which described the objectives of the AMA — ERF Institute for Biomedical Research, was shown. Bill G. Church, M.D., Chairman of SoDaPac spoke following the movie.

MARCH:
Mario Herrera, M.D., Aberdeen, S. Dak., spoke on "External Pacemaking Methods and Indications."

APRIL:
Mr. John Zimmer, Attorney, spoke on "Legal Aspects of Incorporation of District Medical Societies."

MAY:
G. F. Tuohy, M.D., Anesthesiologist from Sioux Falls, S. Dak. spoke on "Inhalation Therapy."

Respectfully submitted,
E. J. Perry, M.D., Councilor
First District

The Committee considered the report of the Councilor of the First District Medical Society and recommends the acceptance of this report.

REPORT OF THE COUNCILOR SECOND DISTRICT

MEMBERSHIP: 26 Members

OFFICERS:

President	D. N. Fedt, M.D.
Vice President	E. H. Heinrichs, M.D.
Secretary-Treasurer	Alan K. Brevik, M.D.
COUNCILOR	G. Robert Bartron, M.D.
BOARD OF CENSORS	C. F. Ryan, M.D. J. J. Stransky, M.D.
DELEGATES	
1 year	Parry Nelson, M.D.
2 years	Gerald Tracy, M.D.
3 years	C. R. Stoltz, M.D.
ALTERNATES	Romans Auskaps, M.D. E. G. Huppler, M.D.

The Watertown District Medical Society holds monthly dinner meetings on the first Tuesday of each month from September to June. In addition to the regular business meetings, the following programs were presented during the year:

February
Mr. Irving Hinderaker, Watertown attorney, gave a talk on "Modern Estate Planning."

March
Dr. Charles F. Ryan, Watertown Radiologist, presented a program about pulmonary A-V fistulas, diagnosis and treatment.

April
Dr. W. Keettel, Head of the Department of Obstetrics and Gynecology at the University of Iowa, spoke about "The use of Endocrines in Obstetrical Gynecology."

May
State Medical Association meeting held in Watertown. District #2 planned and hosted this convention.

June
A special meeting was held at which time the proposal of the State of South Dakota to enter into a study program of computerized medicine was presented and District #2 voted to cooperate with this proposal.

November
Dr. Paul Hohm, Richard Erickson and Mr. Paul Huddle spoke about Medicare, Relative Value Fee Studies, and Blue Shield's role in Medicare.

January
Reverend Father Wagner gave a talk on religion in medicine.

February
Dr. H. F. Aarstad, Watertown dentist, gave a talk on oral hygiene.

March
Mr. Alex Johnson of the Watertown Public Opinion spoke regarding medicine and cooperation with news media.

Several members of District #2 cooperated in the establishment of a County-wide report on mental health. There has been active participation in the Committees on Mental Health and Mental Retardation Planning on a State as well as a County level.

Respectfully,
G. Robert Bartron, M.D.
Councilor

The Committee considered the report of the Councilor from the Second District Medical Society and recommends the acceptance of this report.

REPORT OF THE COUNCILOR THIRD DISTRICT

The officers for 1965 were: President — Doctor Bruce Lushbough; Treasurer and Secretary — Dr. Calvin Kershner; Vice President — Dr. Richard Belatti.

Delegates were Doctors Scheller and Anderson. Alternates: Drs. Wold and Muggly.

Censors were Doctor Friefeld, Roberts and Turner.

First meeting of the Third District, after the last report, was held in Arlington, South Dakota, Thursday, April 8th, 1965. At the first meeting we had a presentation by Dr. Paul Hohm, the President-elect of the South Dakota Medical Association. Dr. Hohm discussed, very completely, the comparative provisions of the old and new Medicare bill in contrast with the "Elder-Care" program of the AMA. His remarks were fully amplified by questions from the members. He said that the only two issues at this time were how to control the administration of the act in order to keep it in our hands and the method of financing, because he felt there was no doubt but what the bill would be passed by the Congress and signed by the President of the United States. The meeting was adjourned following the Secretary-Treasurer's report.

The second meeting of the Third District Medical Society was held at the Brookings Country Club on Thursday, June the 10th, 1965. After the dinner, and golf, a scientific discussion by Dr. Gordon Robertstad of South Dakota State University was given on fungoid diseases and this was very instructive. In the absence of the President and Vice President of the organization, Dr. Walter Patt conducted the business meeting. There were three communications from the State Office. The first was in regard to the establishment of a "Speakers Bureau" asking for volunteers. It was decided to canvass the membership by means of return cards to the State Secretary. The second communication was to announce that there would be a special meeting of the Third District to be held at the Brookings Hospital on Wednesday, July the 7th at 7:30 p.m. for presentation of the proposed medical computer system in South Dakota, at which time hospital administrators would be invited. The third communication suggested the establishment of a hospital utilization committee to prevent over-utilization of beds, also the insurance advisory committee to be set up to review the controversial problems in insurance claims and fees. There being no further business, the meeting was adjourned.

The third meeting of the Third District was held at the Madison Country Club, Thursday, August the 12th, 1965. After a sumptuous dinner and golf in the afternoon, a scientific paper was presented by Dr. John B. Gregg of Sioux Falls, South Dakota; the subject being the treatment of hare lip, cleft palate and the establishment of a Sioux Falls Clinic to take care of such cases and the idea of other clinics and centers throughout the State being established. The business meeting was presided over by Dr. Scheller in the absence of the President and Vice-President. Under the heading of old business, Dr. Scheller brought up the subject of the committee of which he is chairman, namely the collection of SoDaPac contributions, either by the State or local society secretary, along with the yearly dues. The society was "quite cool" to such an arrangement. Under new business, the application for membership of Dr. L. W. Karlen, newly located in Madison was read by the secretary and it was moved and seconded and unanimously carried and the application was accepted. There being no further business, the meeting was adjourned.

The fourth meeting of the Third District was held at the Madison Elks' Club, Thursday, October the 14th. A scientific paper was given by Dr. Bernard Begley, urologist from Sioux Falls. He presented an illustrated lecture on the diagnosis and treatment of prostatic obstruction. The regular business meeting was opened by a talk by Dr. Hohm, South Dakota State President, at his official visitation, and he talked on the doctor's role in medicare. He also reported on the House of Delegates meeting and the decision of the AMA policy for the future. He outlined the legislative committee's report in this regard. The Executive Secretary, Richard Erickson, outlined the purpose of the recent mailing from AMA on Medicare policies and procedures and suggested that a special file be started in each doctor's office for future mailings on the subject. He said that a new fee schedule was in the course of preparation and that a $5.30 point value was suggested. Dr. M. C. Tank announced that he had been elected Director of the South Dakota Health Research Corporation and was its treasurer. By the way, this is the organization to study the feasibility of the computer system. Since there was no other business, the meeting was adjourned.

Our next meeting was held at the Indian Tea Room in Flandreau, South Dakota, December the 9th, 1965. Dr. Otey introduced the speaker, Dr. Kendall Burns of Sioux Falls, whose subject was palliative care of malignancy. The regular business meeting was called to order by President Lushbough and it was decided by the membership that a check in the amount of $11.00 for the auxiliary dues should be collected as before by the District Treasurer. A letter from the Sioux Falls Seventh District on the matter of an affidavit to be signed by the physicians before Welfare Patients benefits will be paid, was read before the society. There was no action taken. Dr. Wold, chairman of the State Utilization and Insurance Review Committee, explained the duties and names of this committee. It was requested that a committee of the Third District be similarly appointed to work within the District in collaboration with the State Committee. The following men were named: B. T. Otey, Chairman; Donald Scheller and R. K. Arbon. A letter from Dr. Bill Church, Chairman of the SoDaPac, was read. It was moved and seconded and carried that a representative be invited to speak at our next meeting. The next order of business was the election of new officers to serve in 1966. The result was President — Dr. R. G. Belatti; Vice President — Dr. Robert E. Shaskey; Secretary and Treasurer — C. M. Kerschner; Delegates — Anderson and Scheller; Alternates — Muggly and Wold; Censors — Drs. Roberts, Turner and Lushbough. The meeting was adjourned.

The last meeting of the Third District, before this report, was held in Brookings on February 10th. There were 22 members present and the Society was addressed by Dr. Bill Church and Mr. James Rosevear, AmPac Field Representative from Minneapolis. They outlined the future program of the organization and the extreme urgency that all members participate and particularly contribute, by continuing their dues. Dr. Belatti called the business session to order. At the request of J. R. Westaby, M.D., the Madison Society unanimously granted him honorary status and the secretary was advised to notify the State Association. Dr. Scheller of Arlington was recommended as the choice of the Society for the nominating committee. The following names were recommended for the State Association for the naming of a councilor for this District: J. R. Muggly, M.D.; Donald L. Scheller, M.D.; and Walter H. Patt, M.D. Under the heading of new business, Dr. Roberts moved and it was seconded by Dr. Turner, that in the future, members who signed the card and did not come to the meeting, which cost the society extra money because of their absence, would be held accountable for their share. The meeting was adjourned.

This is my "swan-song" as a councilor for the Third District. Although I have enjoyed meeting with the rest of the councilors, and the delegates for these last eight years, I feel that someone else should have this responsibility and enjoyment. Adieu, au revoir and good-by.

Respectfully submitted,
M. C. Tank, M.D.
Councilor

The Committee considered the report of the Councilor from the Third District Medical Society. The Committee recommends the acceptance of this report.

The House of Delegates also gave a rising vote of thanks to Dr. Tank in recognition of his ten years of service to the House of Delegates.

REPORT OF THE COUNCILOR FOURTH DISTRICT

A meeting was held on December 14, 1965, with election of officers. The following officers were elected:

President	Barbara Spears, M.D.
Vice President	S. B. Simon, M.D.
Secretary-Treasurer	J. T. Cowan, M.D.
Delegates	B. L. Lindbloom, M.D. R. J. Zakahi, M.D.
Alternate Delegates	J. T. Cowan, M.D. S. W. Fox, M.D.
Censors	C. L. Swanson, M.D.-3 years S. W. Fox, M.D.-2 years S. B. Simon, M.D.-1 year

A District Utilization Committee was also formed with L. C. Askwig, M.D. as chairman and M. M. Morrissey, M.D. and G. I. Westland, M.D.

A discussion on Medicare was given by Dr. Hohm, our State President. The District unanimously approved a resolution to delete the 15 minute time limit so stated in the Joint Commission report, on emergency room care. This resolution was to be presented at the next Council meeting.

The next meeting was held on March 1, 1966, with Dr. Barbara Spears presiding as the District President. A short discussion was held on the application to District Membership by Dr. Ferguson. No action was taken — awaiting reports on his credentials. The actions of the AMA House of Delegates, taken in Philadelphia — November 28, 1965, through December 1, 1965, were then discussed and recommendations noted. A statement of policy was asked by the District membership on the fee to be charged for the examinations of the children in the "Headstart" program. The Councilor reported on the April, 1966, Council meeting and urged that members of the District complete the survey of fees as requested by the State Association. Our guest, Dr. William Church, then discussed AMPAC and SoDaPAC.

Respectfully submitted,
A. J. Tieszen, M.D.
Councilor, Fourth District

The Committee considered the report of the Councilor from the Fourth District Medical Society and recommends the acceptance of this report.

REPORT OF THE COUNCILOR FIFTH DISTRICT

The following is a report from the Councilor of the Fifth District, Huron, of the State Medical Society. This covers the period from the last State Medical meeting in Watertown in May, of 1965, until the present time. On June 30, 1965, the Huron District Medical Society met with Dr. David Buchanan, President, presiding. There were 15 doctors present from the Fifth District, plus their wives. Dr. Patrick Steele and Dr. Scott Allen were guests of the District V Medical Society. Doctor Steele, past-president of the South Dakota State Medical Association, introduced Dr. Scott Allen, a computer specialist. Doctor Allen explained the purpose of the meeting, stating that there has been a grant by an unnamed foundation to study the use of computers in medicine. A pilot program for four years has been proposed in which the entire State of South Dakota would be included, if possible. There was a lengthy explanation of the way computers could help in medicine and several pamphlets were distributed. The entire program will be financed by a foundation, and the State Medical Association and the State Hospital Association will manage the funds. It was emphasized that this project will not cost anything to the doctors of the State, unless after four years the entire membership decides to continue. There being no further discussion, meeting was adjourned. (G. M. Huet, M.D., Sec.-Treas.)

The next meeting of the Huron District Medical Society was December 9, 1965. Again, Dr. David Buchanan, President, presided. There were 21 doctors present from this district plus their wives. Mr. Richard Erickson, Executive Secretary, South Dakota State Medical Association, and his secretary were present; also, Dr. George Knabe, and the assistant director of Blue Shield, who were guests. The minutes of the previous meeting were dispensed with. The treasurer's report was given by Dr. Huet, Secretary-Treasurer. A letter from the State Medical Association office was read, requesting the formation of an Accreditation and Review Committee from this District in order to implement Medicare. This was the meeting for election of officers. Motion was made by Dr. E. C. Hanisch, nominating Dr. DeGeest of Miller for president; seconded by Dr. Odland, and the ballot was unanimous. There was a motion by Dr. E. C. Hanisch to nominate Dr. Clifford Lardinois as vice-president; motion seconded by Dr. Saylor, and the ballot was unanimous.

There was a motion by Dr. Clifford Lardinois nominating Dr. W. O. Hanson, of Huron, as secretary-treasurer. This was seconded by Dr. Huet and unanimously carried. As has been the procedure in the past, the delegates to the State meeting will be the past-presidents, Dr. David Buchanan and Dr. Ted Hohm. The alternate delegates will be the current president of 1966, Dr. DeGeest, and the current secretary-treasurer, which is Dr. Hanson. Motion was made by Dr. Hanisch, and seconded by Dr. Lardinois, that Dr. Bell be nominated as Censor. There was a unanimous vote. The other censors are Dr. Hofer for two years and Dr. DeGeest for one year. Under new business, Mr. Richard Erickson, Executive Secretary, of the South Dakota State Medical Association, talked about the coming State meeting. He outlined different aspects, including where the meeting will be and some of the arrangements that have been made. He also talked about a social program, of which part will be in one of the restaurants or at the Country Club. It was suggested that the luncheon on Monday should be held at the fairgrounds with the hot dog stand and refreshment stand run by doctors from this district. There was unanimous support for this idea. Discussion regarding some of the aspects of the program followed. Mr. Erickson introduced Dr. George Knabe, Chairman of the Scientific Program. Doctor Knabe talked about the scientific session and a copy of the preliminary program is included with these minutes. Considerable discussion followed after his presentation regarding the mode in which the scientific program will be held this year. It is different in format as compared with the ones that have been held previous years. The purpose is to increase the number of people attending the scientific lectures. Mr. Erickson also gave more information about the meeting and stated that he had been advised by the Medical Auxiliary that not enough money was available for all the social activities. There was a motion by Dr. Lenz to give the Huron District Medical Society Auxiliary $250.00 from the District funds. This motion was seconded by Dr. Huet, and discussion followed. There was an amendment by Dr. Paul Hohm to go $100.00 more over this amount, if needed, making a total of $350.00 available. This motion was seconded by Dr. Saylor. Motion passed with unanimous vote. The original motion was then brought to vote and carried. Dr. Leigh informed the group about the last Council meeting. Among the subjects discussed were Medicare, Fee Scale, the money given to the City of South Dakota in Chile, the fact that nominations are needed for the annual distinguished service awards given at the State Medical meeting, and also nominations needed to elect a member to the Board of Basic Science. He again stressed the need for a committee from our District regarding utilization and review, as it will be needed for Medicare. He also discussed a letter from the South Dakota Health and Research Institute. Several other topics were discussed with lively interruptions from the floor. Meeting was duly adjourned. (G. M. Huet, M.D., Secretary-Treasurer).

February 10, 1966, the meeting of the Huron District Medical Society was called to order by Dr. Clifford Lardinois, vice-president, acting as president pro tem in the absence of Dr. DeGeest. There were 19 doctors present from the Fifth District. A letter from the State Office was read regarding candidates for nomination of Councilor to take over the term of Dr. Fred Leigh, which expires this year. The State Office recommended that three nominees be nominated and the names be sent to the State Office. It was moved by Dr. Huet, and seconded by Dr. Saylor,

to re-elect Dr. Fred Leigh as Councilor. This was amended by Dr. Saylor to read that the delegate be instructed to re-elect Dr. Fred Leigh as sole Councilor without any other nominees being presented. The amendment was seconded by Dr. Saxton, and passed by a unanimous vote of membership, as did the motion. Another letter was read from the State Office, which recommended that the Society nominate a member to serve on the Nominating Committee for the State. Dr. Paul Hohm nominated Dr. David Buchanan to be a member of the Nominating Committee at the State meeting. This was seconded by Dr. E. C. Hanisch, Jr., and amended by Dr. Howard Saylor to read that if Dr. David Buchanan cannot be present, Dr. Ted Hohm will serve in his capacity on the Nominating Committee. This amendment was seconded by Dr. Huet, and passed. Doctor E. C. Hanisch requested the floor to discuss proposed legislation, which was backed by the South Dakota OB-Gyne. Society, regarding safeguards and sterilization operations, and procedures for substantiating the same. This proposal, in the form of a Bill, was read. Doctor Hanisch recommended that the Fifth District put their approval on the piece of legislation. It was moved by Dr. Saylor, and seconded by Dr. Hanisch, to table this motion until the next meeting, and this motion passed. Dr. Fred Leigh discussed the proceedings of the last Council meeting at some length. There was no discussion. Doctor Paul Hohm discussed the present status of Blue Cross and Blue Shield and what could be done to alter it so that it would fit in with Title 19, of the Medicare Act, and discussed what happened when they brought this before the Corporate body of Blue Shield. He also mentioned that the Blue Shield would be sending a questionnaire to be filled out by the doctors to ascertain their usual and customary charges for various procedures to set a standard for a feasibility study on the possibility of Blue Shield being implemented to carry out Title 19 of the Medicare Act. It was moved then by Dr. Saylor, after a lot of discussion, that the Huron District comply with filling out the questionnaires, and anybody who failed to fill out the questionnaire should be chastised. This was seconded by Dr. Huet, and motion was carried. Doctor Dean discussed some of the problems of a small hospital regarding utilization in Medicare and hoped that all present would assist him in any way possible. The meeting was duly adjourned. (William O. Hanson, M.D., Secretary-Treasurer).

There will be one more meeting, at least, before the annual meeting, to be held in Huron, in May, at which time we will instruct our delegates for the House of Delegates meeting. Also, I am sure there will be another meeting for final details as to our part in a bigger and better convention.

Respectfully submitted,
F. D. Leigh, M.D., Councilor
Fifth District

The Committee has considered the report of the Councilor from the Fifth District Medical Society and recommends the acceptance of this report.

REPORT OF THE COUNCILOR SIXTH DISTRICT

The following is the Councilor's report for the year 1965 of the business of the 6th District Medical Society. Meetings were held in February, March, June, July, and October of 1965 and February of 1966.

The officers for the year 1965 were as follows:

President	B. R. Skogmo, M.D.
Vice-President	Richard Hockett, M.D.
Secretary-Treasurer	Leonard Tobin, M.D.
Councilor	H. R. Lewis, M.D.
Delegates	Jack Berry, M.D. J. O. Mabee, M.D.
Alternate Delegates	C. F. Binder, M.D. J. P. McCann, M.D.

At each meeting, the reports of the standing committees were read and approved. Programs were held on three occasions in conjunction with a business meeting. On one occasion, a program was offered under the direction of the 6th District Medical Society by the Abbott Laboratories; Dr. Bill Church, Dr. Warren Jones, and Dr. James Goddard were guest speakers at these programs. The special program offered by Abbott Laboratories was highlighted by a tour of the Mitchell M & R plant with a discussion of the Simlac production methods and an elaboration of the special teaching aids offered by Abbott Laboratories on Child Care to physicians. Physicians from neighboring districts and from South Dakota University Medical School were invited to this meeting. Attendance was above all expectations. A highlight of the program at this meeting was a discussion of Medicare problems in child psychiatric practice by the staff psychiatrist of Abbott Laboratories.

Other program material during the year included a discussion of Electrocardio Version by Dr. Warren Jones, a discussion of SoDaPAC by Dr. Bill Church and an elaboration of the Computer System by Dr. James Goddard of the Department of US Public Health and Dr. James Steele, Yankton.

The officers for the year of 1966 were elected in February, 1966 and read as follows:

President	W. H. Fritz, M.D.
Vice-President	F. D. Gillis, Jr., M.D.
Secretary-Treasurer	Jack Berry, M.D.
Councilor	H. R. Lewis, M.D.
Delegates	Judd Mabee, M.D. Richard Gere, M.D.
Alternates	H. B. Munson, M.D. Richard Hockett, M.D.

Respectfully submitted,
H. R. Lewis, M.D., Councilor
6th District

The Committee has considered the report of the Sixth District Medical Society's Councilor and recommends the acceptance of this report.

REPORT OF THE COUNCILOR SEVENTH DISTRICT

Regular meetings of the 7th District Medical Society are held the first Tuesday in each month except during the months of June, July, and August. The Board of Directors meet on the Monday preceding each regular meeting and during the summer on the call of the President.

MAY, 1965:

This meeting was devoted to discussion concerning the coming State Medical Society meeting and instructions to the delegates.

SEPTEMBER, 1965:

One doctor was admitted to full membership after the usual probationary period of one year and two doctors were accepted for probationary membership. A committee of four members was named to implement "community health week" to be observed November 7 to November 13, 1965.

A motion to withdraw the objection of the 7th District Society to the Blue Shield program until the national political picture has become more stabilized was passed by unanimous vote.

OCTOBER, 1965:

One doctor was accepted for full membership after a one year probationary period and one doctor was accepted for probationary membership. Mr. James Rosevear, AMPAC field representative from Minneapolis, gave a very interesting talk and a plea for support of the political arm of American medicine.

NOVEMBER, 1965:

In lieu of the regular meeting an all day symposium sponsored by Lederle was held at the Sheraton Cataract Hotel. This very interesting and informative meeting was well attended by the District membership. A banquet in the evening was well attended by the Doctors and their wives.

DECEMBER, 1965:

Doctor Paul Hohm, State Medical Association President, made the annual visitation to the 7th District and gave his studied opinions regarding the new Med-

UNIVERSITY OF MARYLAND

icare law. He particularly dwelt on utilization committees and participation. There were differing opinions heard from the floor and the discussion that followed was lively and informative. Mr. George Wells of the Health Insurance Council gave an interesting talk on the role played by private insurance companies in American medicine. He made a plea that the private carriers, as well as Blue Shield should be considered as an intermediary in the medicine scheme.

The Nominating Committee report was presented and a motion made and seconded that it be accepted, nominations closed and a unanimous ballot be cast for the presented slate of officers. This motion passed by unanimous vote.

The new officers are:

President	J. B. Gregg, M.D.
Vice-President	J. S. Devick, M.D.
Secretary	B. J. Begley, M.D.
Treasurer	D. L. Ensberg, M.D.

Two doctors were given full membership in the Society. The President appointed a Utilization and Review Committee consisting of five members of the Seventh District. An ambulance service committee was also appointed to meet with the different authorities and agencies involved, and to discuss the problems relative to emergency ambulance service.

JANUARY, 1966:

The Articles of Incorporation for the 7th District were read and on motion the Society voted in favor of accepting them.

A committee of five doctors was appointed to study the need, if any, and feasibility of a visiting nurse service in our area.

FEBRUARY, 1966:

A letter from Dr. Hayes, Past President of the State Medical Association, now on U.S.P.H. Service appointment in Viet Nam was read. Dr. Hayes mentioned medical supplies that were desperately needed in the civilian's hospital to which he was attached. The Society moved to send to him the needed supplies, the cost including transportation amounting to more than $650.00 to be borne by the 7th District. The new By-Laws were discussed and a motion to adopt them was passed. The 7th District membership roster shows:

112 active members
11 life members
7 eligible for membership

MARCH, 1966:

This was the annual dinner meeting with the wives and no business meeting was held.

Respectfully submitted,
E. T. Lietzke, M.D.
Councilor, 7th District

The Committee has considered the report of the Councilor from the Seventh District Medical Society and recommends the acceptance of this report.

REPORT OF THE COUNCILOR EIGHTH DISTRICT

On March 12, 1965, the Executive Committee of the Eighth District Medical Society met at the home of Dr. Robert F. Thompson, 1212 Douglas, Yankton, South Dakota, at 8:00 p.m. Present were Drs. Thompson, N. B. Saoi, and G. Knabe, Jr. In accordance with action taken by the Society at its meeting on February 19, 1965, the position of Executive Treasurer was assigned a yearly salary of $120.00. This comes from the general fund. The Executive Treasurer for the first year would be Mr. Hal Anderson, Manager of the Medical Clinic, Yankton, South Dakota. The following year, this position will be passed on to Mr. Fred Braastad, Yankton Clinic, Yankton, South Dakota. It was recommended that the AMA-ERF contributions solicited at the time of dues be increased from $1.50 to $2.00 in part to facilitate accounting. It was also announced that Dr. Roy K. Kramer had moved from Yankton to the City of Hope Hospital, in Duarte, California. As directed by the Society at its February 19 meeting, a request for a contribution to the Science Fair at Vermillion was considered. It was decided that since the Eighth District Medical Society's resources were limited and also because of the fact that the State Medical Society was contributing, that no contribution would be given. It was decided also that the next District Medical Society meeting would have to have had a change in the program format. This is as follows: 5:30 p.m. Scientific presentation. 6:30 p.m. Business meeting; 7:30 p.m. Social hour and dinner. The next meeting was tentatively scheduled for May 5 in Yankton. The speaker is to be Dr. Armand Quick, professor and chairman, Department of Bio-Chemistry, Marquette University School of Medicine.

On May 5, 1965, the meeting was held at the Black Steer Restaurant, Yankton, South Dakota. The Scientific Session consisted of a talk on "The Importance of Hemorrhagic Disease in General Practice" by Armand J. Quick, M.D., Ph.D., Marquette University, Milwaukee, Wisconsin. Discussion was held on the annual program format, the suggestion having been offered by the Yankton District that the special society meetings be included as an integral part of the annual meeting of the SDSMA. Dr. Behan mentioned the advisability of physicians becoming intimately involved in planning for the community health program inasmuch as this will affect their practice directly. Dr. Clark Johnson reported on his attendance at the Venereal Disease Seminar held in Denver, January 12-15, 1965, under the auspices of the U. S. Public Health Service. He called attention to the rising rate of syphilis among teenagers and indicated that intensive effort on the part of organized medicine was indicated to prevent resurgence of these diseases. Consideration was also given to the President's Commission on Heart Disease, Cancer and Stroke. The application for membership of Richard I. Porter was presented and accepted.

On June 7, 1965, a special meeting of the Yankton District Medical Society was held at 7:30 p.m. in the auditorium of the Yankton State Hospital Science Building. The purpose was to discuss the use of computers in the practice of medicine for storing and recalling medical data by the practicing physician. Officials from the Public Health Service and Systems Development Corporation were present to explain this system. Discussion was held relative to the feasibility of setting up a computer system through the Medical Association in the State to gather the above mentioned data and it was the opinion of the members of the Society there that the Eighth District Society would be unanimous in their support of such a study. Dr. J. P. Steele would keep us informed on this venture.

On October 21, 1965, the fall meeting of the Eighth District Medical Society was held at the Yankton State Hospital, Yankton, South Dakota. Dr. Paul Hohm, President of the SDSMA, was present to discuss Medicare and its implications and the actions and recommendations of the AMA. Non-participation was deferred and it was indicated that doctors must cooperate with the law but should also point out to the public the undesirable features of the Medicare law. We should participate in AMPAC. Mr. Erickson also stated that the office would keep the doctors informed as to all of the information they were receiving on Medicare. Dr. J. P. Steele, in discussion, advised that public relations efforts were needed to apprise patients of their responsibilities under the law to collect from the program and to pay for the medical care. Assignments can be accepted. The physician has this decision to make. Mr. Erickson advised the relative study had been worked on for two years and negotiated at $5.30 a unit. Under Medicare, it will be necessary for insurance advisory committees and hospital utilization committees to be developed. A bookshelf in memory of David Eyres, the son of Dr. and Mrs. Tom Eyres, has been established in the Medical Library and the Executive Committee of the Eighth District has authorized $25.00 for this purpose.

A meeting was held July 9th to discuss the feasibility method of collecting data in South Dakota at the Yankton State Hospital. Both Sacred Heart Hos-

pital and Yankton State Hospital personnel were there to discuss the data processing and information program under study. This was reported in the above paragraph on their special meeting. The application of Donald H. Lindeman of Viborg was accepted as was the application for associate membership of Mark M. Cohen, M.D. of the U. S. Public Health Service Indian Hospital, Wagner, South Dakota.

It was recommended that investigation be made of the ways to increase contributions to the scholarship fund at the University of South Dakota Medical School and that necessary recommendations be forwarded to the Council and the Medical School Affairs Committee. A suggestion that grants be given to students was rejected in favor of continuing loans for these students.

Announcements of forthcoming AMA meetings were conveyed. A resolution of appreciation was awarded to the Yankton State Hospital for its hospitality.

On December 1, 1965, the Eighth District Medical Society met at the Prairie Restaurant in Vermillion, South Dakota. The Scientific Portion of the program consisted of a presentation by John A. Moncrief, Colonel Medical Corps, Director Army Surgical Research Unit, Brooke Army Medical Center, Fort Sam Houston, Texas. His topic was "Burn Wound Sepsis." This was presented at the Science Center Auditorium at the University of South Dakota, Vermillion.

The business meeting consisted of the financial report. In the absence of Dr. Saoi, Dr. D. M. Reade conveyed the report from our Executive Treasurer, Mr. Hal Anderson, that the cash balance as of December 1, 1965, was approximately $1,859 of which $183.00 is due the Auxiliary. It has previously been decided that the Treasurer's books will alternate between the managers of the Medical Clinic and the Yankton Clinic on a yearly basis and that these executive treasurers will function as auditors for the books. Dr. C. F. Johnson solicited nominations for the distinguished service award, that is, someone from the District who is not an M.D. but who has contributed and cooperated with various areas of medicine and (2) the community service award; a physician who is active in community affairs as well as in the practice of medicine. A letter prepared by Dr. Johnson will be mailed to all members of the District requesting that they supply him with these nominations by December 15. It was also requested that the utilization committee and an insurance review committee be formed in the District to coordinate with local hospital committees and the recently appointed State Medical Society Utilization Committee. It was recommended that the Committee consist of Dr. H. C. Andre, Chairman; Dr. R. J. Foley, Tyndall; and Dr. R. F. Thompson, Yankton. Material received from the AMA concerning public information on VD was given to Dr. Johnson, who will serve as the District's coordinator for developing a program to advise high school students about venereal disease. The cooperation of the membership was pledged in carrying out this program. Dr. Foley advised that the following slate of officers for the next year be proposed: President, D. M. Reade; Vice-President, G. W. Knabe, Jr.; Secretary, N. B. Saoi; and Treasurer, D. J. Glood. The delegates to the State Medical Association are Dr. R. J. Foley and Dr. G. W. Knabe, Jr. Alternate delegates are L. G. Behan and H. C. Andre. It was unanimously approved that the officers and delegates be elected. Dr. C. F. Johnson and Dr. Porter of Yankton reported on the Diabetes Detection Week activities in that area. The Yankton Press and Dakotan Newspaper and radio stations WNAX and KYNT carried spot announcements as well as articles in the paper. Dr. Knabe made announcements of certain medical meetings forthcoming and the publications available for purchase.

On February 10, 1966, the Eighth District Medical Association met at the Skyline Restaurant, Yankton, South Dakota. The business meeting was called to order at 6:30 P.M. by Dr. D. M. Reade. Dr. H. C. Andre's Chairmanship of the Utilization Committee was withdrawn. It was moved by Dr. C. M. McVay and seconded by Dr. R. F. Hubner, that Dr. R. F. Thompson be made chairman of the District Utilization Committee and the Executive Officers be members of this committee.

In response to Mr. Richard Erickson's letter dated January 4, 1966, concerning the nomination of a delegate or alternate delegate from the Eighth District Medical Association to be on the Nominating Committee of the State Medical Association, it was moved that Dr. G. W. Knabe, Jr. be this Committee member. The motion was carried. Dr. C. F. Johnson made a report on the last corporate meeting of Blue Shield. He mentioned that a study of prevailing fees would be made among the doctors in the State of South Dakota in order that Blue Shield might ascertain the feasibility of setting up a "Prevailing Fee Schedule" in South Dakota and write an appropriate Blue Shield policy for sale to the public. Dr. C. F. Johnson reported on the Distinguished Service Award nominees which consisted of (a) Mr. Guy Harvey for the Distinguished Service Award. After some discussion Dr. J. P. Steele moved that the Eighth District Medical Society allocate one thousand dollars ($1,000.00) or less, but not over for the Public Relations Committee. Dr. Willcockson seconded the motion. There will be further discussion at our next District meeting. It was decided that Dr. J. P. Steele be chairman of the Public Relations Committee and the Executive Officers of the Yankton District Medical Association be members. Our guest speaker for the evening was Mr. Richard Erickson, Executive Secretary, South Dakota State Medical Association, Sioux Falls. Questions on "Recent Views of the Medicare Program" were answered by Mr. Erickson. He stated the South Dakota Blue Cross and Blue Shield will be the carrier for the Medicare Program. The prevailing fee in the community may be the fee that is charged by the doctor. He also mentioned that the attending physician under Medicare can take assignments or not and he can charge whatever the difference is between his fee and what is allowed under Medicare. Mr. Erickson also mentioned Senate Bill No. 52, an Act relating to immunity from liability of certain members of professional societies who are appointed members of a committee of a medical staff in hospitals. He also reported on House Bills 740 and 741, which enable the State to proceed with implementation of Titles 18 and 19 of the Medicare Law for certain categories of welfare assistance. Both bills passed the South Dakota State Legislature. After the scientific meeting, dinner was served to the members and their wives.

Respectfully submitted,
Clark F. Johnson, M.D.
Councilor, Eighth District

The Committee has considered the report of the Councilor from the Eighth District Medical Society and recommends the acceptance of this report.

REPORT OF THE COUNCILOR BLACK HILLS DISTRICT MEDICAL SOCIETY

During 1965 there were six regular and one special meeting of the Society.

February 9—

Meeting held at Arrowhead Country Club. Professional Program included three separate discussions; a case of Illeo-ileo intussusception was presented by Dr. Harris. Discussion of a harness mechanism for displacement of the hip was presented by Dr. Leeds and Dr. Johnson discussed a rare combination of Addison's Disease combined with asthma. In the business portion of the meeting, it was agreed that the August Spearfish Fish Fry would be discontinued and that this particular meeting would be incorporated into the Black Hills District Medical Seminar. The Councilor introduced the idea of a one day orientation program prior to licensure of physicians in the State of South Dakota, but his proposal was rejected by the District. A committee was appointed to discuss the feasibility of inviting

(Continued on Page 40)

In Diverticulitis...

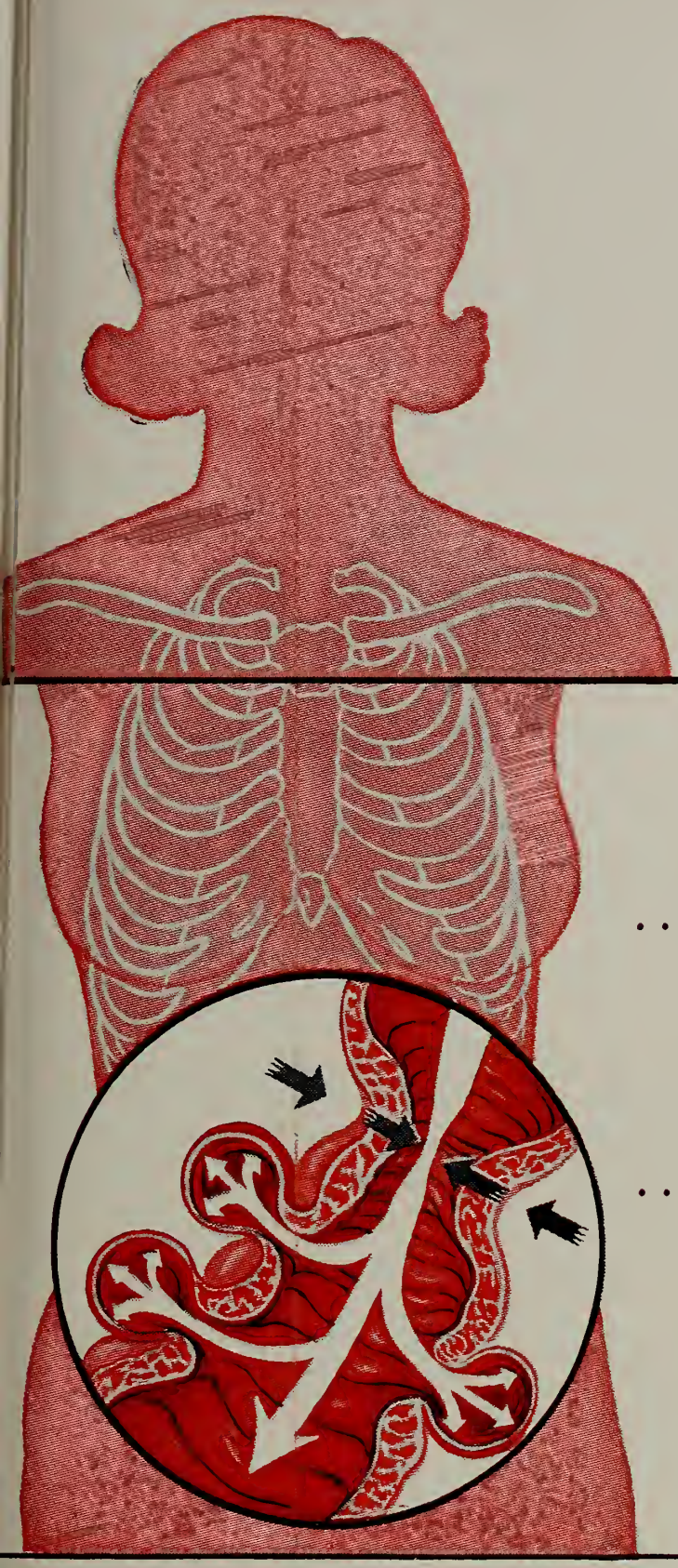
Increased pressure from straining aggravates diverticulitis

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brand of psyllium hydrophilic mucilloid

Metamucil Powder: 4, 8 and 16-ounce containers.

Instant Mix Metamucil: cartons of 16 and 30 single-dose packets.



Metamucil

. . . to counteract the constipation which is etiologically important and

. . . to protect the mucosal surface against physical irritants.

Average Adult Dosage:

One rounded teaspoonful of Metamucil (or one packet of Instant Mix Metamucil) in a glass of cool liquid one to three times daily.

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(Continued from Page 37)

Southwest Blood Bank into the District to establish a blood bank in the Black Hills area.

April 8—

Meeting held at Ft. Meade Veterans Hospital, Sturgis, South Dakota. Scientific program on "Early Recognition and Treatment of Mental Depression" was presented by Dr. Lysloff. A report of the Blood Bank Committee was received from Dr. Geib and the recommendation for establishing Southwest Blood Bank in the Black Hills area was unanimously accepted. The current immunization program of the State Health Department was discussed following a letter from Dr. Jacobson of Hot Springs and general disapproval of a State sponsored immunization program was expressed. The name of Dr. Lyle Hare was submitted to the State Association with recommendation for Honorary Life membership. A resolution in favor of reimbursement of delegates and councilors of the South Dakota State Medical Association was introduced by Dr. Hamm. This was accepted and was to be forwarded to the State Medical Association for consideration.

June 8—

Meeting held at Ellsworth Air Force Base, Professional Program was presented by the staff of the AFB Hospital. "Operation Headstart" was discussed but no action was taken. There was also a short report from Dr. Munson, chairman of the Sterilization Committee with special reference to the sterilization laws of North Carolina and Virginia.

June 25—

Special meeting — was held at 7:30 P.M. in the Staff Room of St. John's McNamara Hospital, where Dr. Pat Steele, James L. Goddard, Ass't Surgeon General USPHS; Robert Harrington, PHD of Systems Development Corporation, and Dr. Scott Allen of the U. S. Public Health Service, presented a program on the proposed computer system for the State of South Dakota. The response of the District members was favorable and a resolution instructing the Councilor to vote in favor of a feasibility study of a System analysis and Computer System was carried unanimously.

August 6—

Black Hills Medical Seminar held at Surbeck Center at the School of Mines and Technology. This was a one and a half day Scientific Meeting. The meeting was attended by over 100 physicians; several different states were represented.

October 12—

Meeting at Arrowhead Country Club. Scientific Program by Dr. R. J. Ballestero, M.D. of Sioux Sanatorium, who presented an interesting talk on bronchiectasis demonstrated with slides and films. It was agreed that a Medical Seminar would again be held in 1966 and the President was instructed to appoint committees to start planning the program. The committee for Study of Sterilization Laws presented a copy of a model law to be added to the Statutes of South Dakota. After much discussion, motion for recommendation of adoption of a Sterilization Law was made and carried with a vote of 22 to 7. It was noted that Dr. Morris Pemberton, a long time member of the Society, had died recently and a memorial was sent by the District.

Dr. Paul Hohm, president of South Dakota State Medical Association, gave a brief talk on Medicare in which he urged that M.D.'s acting as good citizens and according to the Law of the land, would work in a spirit of cooperation, but not necessarily as collaborators in the Medicare Program.

Mr. Erickson, executive secretary, South Dakota State Medical Association, discussed the Medicare material which would be forthcoming from AMA and urged the necessity of keeping a file of this material and keeping well informed.

December 9—

Meeting held at Arrowhead Country Club — The Scientific Program was presented by Dr. Porter of Connecticut, sponsored by the American Heart Association. This was a very interesting program on "Stroke and Rehabilitation." Dr. Walter Hard, Dean of Medical School, University of South Dakota, then discussed the Heart Disease, Cancer and Stroke Program of the Federal Government and presented observations on the possible impact on the Medical School. A committee for the study of Utilization Review in the District was appointed. The Councilor discussed the concept of usual and customary fees. A new slate of officers for 1966 was elected. President — Dr. Harold L. Frost; Vice President — Dr. T. R. Jacobson; Secretary-Treasurer — Dr. John M. Hewitt.

During the year the following members were accepted into this Society: Dr. C. R. Herbrandson of Homestake Hospital, Lead; Dr. Streeter Shining, Rapid City; and Dr. Reding, Belle Fourche.

Respectfully submitted,
John T. Elston, M.D.
Councilor, 9th District

The Committee has considered the report of the Councilor from the Ninth District Medical Society and recommends the acceptance of this report.

REPORT OF THE COUNCILOR NORTHWEST DISTRICT

B. P. Nolan, M.D., Secretary-Treasurer
H. E. Lowe, M.D., Councilor and Delegate
L. M. Linde, M.D., Alternate Delegate

The annual meeting was held at the Moose Club in Mobridge, South Dakota, in October, 1965. Richard C. Erickson and Dr. Paul Hohm were present. Dr. Hohm gave a talk on the various aspects of Medicare.

Respectfully submitted,
Harold E. Lowe, M.D.
Councilor

The Committee has considered the report of the Councilor from the Eleventh District Medical Society. The Committee noted that the District has held only one meeting during the past year. The Committee suggests that the District have more scheduled meetings to keep abreast of the functions and activities of the State Society.

REPORT OF THE COUNCILOR TWELFTH DISTRICT

Three meetings were held during the past year. At the July, 1965 meeting in Milbank, Dr. James P. Steele gave a discussion on the computer system for the use of South Dakota physicians. The group voted in favor of a trial period.

At the September 8, 1965 meeting held at Webster, Dr. Hohm, Richard Erickson and Randall Tuffs gave reports on the Medical Association business and Medicare.

At the February 16, 1966 meeting held at Sisseton, Dr. Heinrichs, Watertown Pediatrician, discussed common problems in the perinatal period.

The same slate of officers was elected as last year. They are as follows:

Secretary—Dr. Ruth Czajkowskyj
President—Dr. Kass
Councilor—Dr. Johnson
Delegate—Dr. Brauer

Respectfully submitted,
E. A. Johnson, M.D., Councilor
Twelfth District

The Committee has considered the report of the Councilor from the Twelfth District Medical Society. The Committee recommends the acceptance of this report.

REPORT OF THE COUNCIL 1965-1966

There were three meetings of the Council held during the year, the minutes of which have been published in the SOUTH DAKOTA JOURNAL OF MEDICINE AND PHARMACY.

The Chairmen of the various Commissions have made periodic reports of their deliberations at each Council meeting which have also been published.

The Council meetings have been dutifully attended by the officers and councilors of South Dakota State Medical Association.

Respectfully submitted,
John T. Elston, M.D.
Chairman of the Council

The Committee considered the report of the Chairman of the Council and found it to be satisfactory. The Committee recommends the acceptance of this report.

REPORT OF THE COMMISSION ON MEDICAL SERVICE

This was a quiet year for the Commission. The Commission met formally in Rapid City on August 7, 1965, and in Huron on January 8, 1966. Other matters were handled by correspondence. The following business is reported to the House of Delegates:

1) The resolution submitted by the Seventh District Society relating to change in or abolition of the South Dakota Blue Shield was considered. After considerable deliberation, it was referred back to the Seventh District for clarification. The matter was tabled by the Seventh District.

2) The By-Laws, Rules and Regulations of the South Dakota Medical School Endowment Fund, Incorporated, were reviewed and revised, with legal counsel. After their acceptance, it became an autonomous organization, separated from the Medical School Affairs Committee and the Commission on Medical Service. The members of the Medical School Endowment Fund will henceforth be appointed by the Council of the South Dakota State Medical Association, their terms being staggered to promote continuity.

3) The Medical School Endowment Fund Committee reported that about $3,000.00 had been realized by the campaign at the recent State Medical meeting.

4) This Commission recommended to the Council of the State Medical Association that a special presentation be made to the Regents of Education in South Dakota to support a request for matching monies for a building proposal that would relieve the present shortages at the Medical School. It was also recommended that the Board of Regents implement an adequate retirement system and salary raises for the Medical School. These recommendations were accepted by the Council.

5) The Traffic Safety Committee reported that there have been several meetings of the Medical Advisory Committee to the Department of Motor Vehicles. A form is being worked out to be completed by the family physician in those cases in which the Medical Advisory Committee needs further information to evaluate the medical aspects of driver-license applicants. It is being designed in such a manner that it will provide maximum information with the minimum effort on the part of the family physician. The Motor Vehicle Department is also establishing a code to be used on the back of drivers licenses to convey pertinent information regarding mental illness, alcoholism, and drug addiction as it relates to the licensee.

6) It was recommended by this Commission to the Council at its January 8, 1966, meeting that a bill be drafted and introduced at the State Legislature, authorizing matching funds for the Federal funds available for the building expansion program of the Medical School at the University of South Dakota. The recommendation was accepted by the Council and appropriate action was taken.

7) The subject of the standpoint of the South Dakota State Medical Association in regard to "Emergency Room" coverage at the hospitals in this State was investigated and a report sent to the Council.

8) The Rural Health Conference held at Colorado Springs, Colorado, March 18-19, 1966, was attended by the executive secretary of the State Medical Association, in the absence of Dr. J. A. Anderson of this Commission, due to his illness. A formal report will be forthcoming later, but no momentous decisions were reached.

9) It is recommended to the House of Delegates that a uniform college physical examination form and athletic examination form be adopted by the South Dakota State Medical Association.

Respectfully submitted,
COMMISSION ON MEDICAL SERVICE
J. B. Gregg, M.D., Chairman
R. C. Jahraus, M.D.
Harold Adams, M.D.
Robert Stiehl, M.D.
G. E. Tracy, M.D.
T. H. Willcockson, M.D.
L. H. Amundson, M.D.
John J. Stransky, M.D.
F. R. Williams, M.D.
A. M. Semones, M.D.
J. A. Anderson, M.D.
Warren Jones, M.D.

The Reference Committee reviewed the Report of the Commission on Medical Service, which included: 1) A uniform physical examination form for all state schools and private schools of higher learning; 2) The vaccination-aid program to be endorsed by the South Dakota State Medical Association. This program is to be encouraged through the patient's private physician; 3) The recommendation was made to perfect a uniform, or standardized, physical examination form for high school athletics. The Reference Committee recommends acceptance of this report.

REPORT OF THE COMMISSION ON LIAISON WITH ALLIED ORGANIZATIONS

1. NURSING—None.
2. IMPROVEMENT OF CARE OF THE PATIENT — The Commission was represented at all meetings of the Committee for Improvement of Patient Care.
3. MEDICO-LEGAL — There was no business transacted regarding this field. The next Medico-legal meeting will be held in the Fall of 1966 in Rapid City, South Dakota.
4. PHARMACY — A liaison meeting between the South Dakota State Medical Society and the South Dakota Pharmaceutical Society was held at the Society office in Sioux Falls in July, 1965. At that time, a complaint was made to the representatives of the Medical Society that certain physicians across the State were in violation of the federal law, in that they were allowing unqualified persons to dispense drugs. The Pharmaceutical Society had drafted a resolution at the South Dakota Pharmaceutical Association Convention in May, 1965 which essentially would change the wording in the South Dakota Pharmacy Law 27.1013, Paragraph 2, to insert that "the physician and veterinarian should dispense by his own hand such drugs and medicines as deemed by him proper." This was inserted in the hopes that this would prevent doctors from allowing their hired help such as office girls, nurses, and anyone else other than pharmacists or physicians from dispensing medicines to patients. We did not wish any general fight to develop on the floor of the State Legislature regarding this. Therefore, it was decided that a series of letters would be sent to all members of the Medical Society, apprising them of the law and how this law might possibly be violated. A second follow-up letter was sent out to all members across the state reemphasizing this problem. It was felt that a repeat meeting would be held with the South Dakota Pharmaceutical Association in Summer, 1966. At that time, a final decision would be made as to what steps could be taken to deal with the physicians who might still be in violation of this federal law.

   As of now, we have good rapport with the Pharmaceutical Society, and it is hoped by continuing a close liaison with the Pharmaceutical Society, that we can prevent any generalized fight or disagreement from developing between our two Societies.
5. VOLUNTARY HEALTH AGENCY—None.

6. DENTAL—None.
7. RELIGION—None.

Respectfully submitted,
COMMISSION ON LIAISON WITH ALLIED ORGANIZATIONS
Marion R. Cosand, M.D., Chairman
C. L. Swanson, M.D.
David Buchanan, M.D.
A. J. Tieszen, M.D.
V. V. Volin, M.D.
F. D. Gillis, M.D.
R. F. Thompson, M.D.
Dagfinn Lie, M.D.
Ted Hohm, M.D.
D. L. Ensberg, M.D.
Mary Sanders, M.D.
A. W. Spiry, M.D.

The Reference Committee reviewed the report of the Commission on Liaison with Allied Organizations and recommends the acceptance of the report.

REPORT OF THE COMMISSION ON SCIENTIFIC MEDICINE

No. 8

The Commission held meetings August 5, 1965, in Rapid City; October 10, 1965, in Huron; and March 12 and April 16, 1966, in Sioux Falls.

1. **Mental Health:** Commission members continue to convey to state planning officials the recommendations of the medical association concerning development of community mental health services. Dr. R. B. Leander has been appointed to establish an ad hoc committee to assist the Commission in its actions in this field. Dr. R. S. Jones serves as liaison with the Association of the South Dakota Mental Health Centers. Dr. Knabe attended the Fourth Regional Workshop on Mental Health of the AAGP-APA in Omaha, September 17-19, 1965, under chairmanship of A. P. Reding, M.D. Dr. P. Hohm who also attended appointed a State Steering Committee for Continuing Education in Psychiatry with Dr. Reding, chairman; L. G. Behan, R. B. Leander, E. T. Lietzke and G. W. Knabe. A postgraduate workshop on psychiatry was planned for the annual meeting. Dr. R. S. Jones attended the 12th Annual AMA meeting of State Mental Health Representatives, March 18-19, 1966.

The Reference Committee recommends acceptance of this portion of the report.

2. **Mental Retardation:** The final report of the state planning commission on mental health makes certain recommendations for SDSMA action. Dr. E. H. Heinrichs continues to advise that agency of SDSMA policy and will form an ad hoc committee to assist the Commission in developing and implementing policy in this complex area of health planning.

The Reference Committee recommends acceptance of this portion of the report.

3. **Tuberculosis:** The Commission has continued to press for action on SDSMA's recommendation for further implementation of the Tuberculosis Control and Treatment Law of 1963, which were favorably received by the State Health Department. Hopefully, a long-deferred joint Commission-Health Department meeting this spring also will help to resolve problems which have arisen with regard to charges and diagnostic laboratory work. Dr. Van Heuvelen advises that there is assurance that a U. S. Public Health Service physician will be assigned to direct the program in the near future.

The Reference Committee strongly recommends that a meeting be held including representatives of the State Health Department, State Medical Association, Commission on Scientific Medicine, and the newly appointed United States Public Health Officer as soon as he arrives. The committee recommends acceptance of this portion of the report with the above addition.

4. **Aging:** Dr. G. W. Knabe, Jr., participated in the AMA-sponsored Conference on Aging and Long-Term Care in Denver, October 7, 8, 9, 1965. Because of new programs being promoted by the recently-created Administration on Aging under the Older Americans Act of 1965, the Commission secured the endorsement of the Council in recommending the Governor appoint an Advisory Committee or Council on Aging to assist in the development of State programs. A list of proposed members of such a group is being compiled.

The Reference Committee recommends acceptance of this portion of the report.

5. **Heart Disease:** A State steering committee has been established to initiate planning under the regional program to combat heart disease, cancer and stroke. Dean W. L. Hard is chairman and the medical school will act as applicant for federal support under the program. Dr. B. C. Lushbough is the Commission's representative on this committee.

The Reference Committee recommends we continue to keep close liaison with this steering committee, and also recommends that more than one physician representative be appointed from the State Medical Association, preferably one representative from each Commission. The Reference Committee recommends acceptance of this report.

6. **Other Programs:** Dr. S. W. Fox is in charge of developing plans for SDSMA guidance in organizing local diabetes detection drives in conjunction with Diabetes Detection Week, in November, 1966. Dr. C. F. Johnson similarly has been evaluating methods to conduct anti-venereal disease programs.

The Reference Committee recommends that we commend S. W. Fox, M.D. and C. F. Johnson, M.D. for their work in the areas of diabetes and anti-venereal disease.

7. **Annual Meeting:** The Commission will evaluate the conduct of the scientific meeting, as it has been developed under the new format. Continued efforts will be made for improvements in scientific and educational content of future meetings.

The Reference Committee recommends a commendation be given to the Commission on Scientific Medicine for their efforts to improve the quality and calibre of the State meeting.

Respectfully submitted,
COMMISSION ON SCIENTIFIC MEDICINE
George W. Knabe, Jr., M.D., Chairman
Robert Jones, M.D.
S. W. Fox, M.D.
Robert Nelson, M.D.
Bruce Lushbough, M.D.
J. T. Elston, M.D.
E. H. Heinrichs, M.D.
R. B. Leander, M.D.
Clark Johnson, M.D.
Noel deDianous, M.D.
Judson O. Mabee, M.D.
Robert K. Johnson, M.D.

The Reference Committee recommends the acceptance of the report as a whole with the above amendments.

REPORT OF THE COMMISSION ON INTERNAL AFFAIRS

The Commission on Internal Affairs met at the Medical Association Building on September 11, 1965. The members present were Drs. H. L. Saylor, H. J. Stensrud, William Hanson, J. C. Hagin, A. P. Reding, C. Rodney Stoltz, C. E. Tesar and D. L. Scheller, chairman.

A discussion was held on resolution #4 submitted by the 9th District Medical Society. This resolution would abolish the House of Delegates and expand the Council to one Councilor for each fifty members. Through the passage of this resolution all the business of the Association would be carried on by the Councilors and Officers of the Association at their four yearly Council meetings.

The Commission studied this resolution carefully and decided that it was not in the best interests of the Association because it potentially concentrates too much power in the hands of too few people.

The Reference Committee recommends the acceptance of the first three paragraphs of the Commission's Report.

The Commission, after careful study, recommended that resolution #3 submitted by the Seventh District be acted on favorably, excluding not only the Councilors but also the Officers of the State Association as voting members of the House of Delegates unless they are specifically delegated by their District Medical Society as a delegate or alternate delegate.

It was the decision of the Reference Committee that it was not in the best interest of the Association to exclude the Councilors and Officers of the State Association as voting members of the House of Delegates. Therefore, the Committee recommends not accepting the fourth paragraph of the Commission's report.

It was further recommended that only delegates or alternates, certified in writing by the Secretary of the District Medical Society and accepted by the Committee on Credentials, be seated at the sessions of the House.

The Reference Committee recommends that paragraph 5 relating to the certification of delegates be allowed to be in action for several years, then if inequities seem to appear in representation, paragraph 4 may be reconsidered.

It was also recommended that the Speaker of the House of Delegates appoint all Reference Committees of the House of Delegates and notify the appointees in writing not less than thirty days prior to the date of the annual meeting.

The Reference Committee recommends acceptance of paragraph six.

It was also recommended that to implement resolution #3, the By-Laws be changed by eliminating that portion of Article 6, Section 2, on "Composition" starting with "and, (2)" deleting the remainder of this section, which will then read:

Section 2, Composition

The House of Delegates will be composed of (1) delegate elected by the component societies, each component society being entitled to elect one delegate for each 20 active and life members in good standing, or fraction thereof, who enjoy all the rights and privileges of membership, provided each component society shall be entitled to elect at least one delegate.

The Reference Committee recommends not accepting paragraph seven of the report.

It was recommended that the publication of the code of "Medical Ethics" be sent to every doctor in the State, rather than just the members of the Association.

The Reference Committee recommends the acceptance of paragraph 8, changing the word "doctor" to "physician."

The Commission considered the feasibility of a central billing system for State and local dues through the Association office. It was recommended that until better facilities are available, central billing should not be done through the central office but be left to the District Medical Societies.

The Reference Committee recommends acceptance of paragraph nine of the report.

BENEVOLENT FUND FINANCIAL STATEMENT

March 1, 1965-March 1, 1966

Balance in Bank, March 1, 1965		$4,693.55
INCOME		
Interest	$465.23	
Donations	745.00	
	$1,210.23	
TOTAL INCOME		1,210.23
Balance in Bank, March 1, 1966		$5,903.78
Assets of this Fund are as follows:		
Government Bonds	$ 3,000.00	
Loans (18)	7,550.00	
Cash in Bank	5,903.78	
	$16,453.78	

The Reference Committee recommends acceptance of this portion of the report.

OBITUARY RECORD REPORT

T. W. Murphy, M.D., Bristol, died in May, 1965.

Arnold K. Myrabo, M.D., Sioux Falls, died in June, 1965.

Joseph F. Malloy, M.D., Leola, died in July, 1965.

M. O. Pemberton, M.D., Deadwood, died in October, 1965.

J. M. Butler, M.D., Hot Springs, died in March, 1966.

The Reference Committee recommends the acceptance of this portion of the report with the addition of: S. A. Donahoe, M.D., Sioux Falls; R. C. McCroskey, M.D.. Rapid City; R. B. Fleeger, M.D., Lead; and L. H. Haug, M.D., Beresford.

A meeting on Medical Ethics held in Chicago on March 5th and 6th was to be attended by the Commission Chairman, Dr. Scheller, but the blizzard made it impossible to get there.

BUDGET COMMITTEE

The Budget Committee met at the association office on December 16, 1965, and approved the following budget for the year 1966-67.

INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
State Dues	$47,500.00	$47,500.00
Annual meeting	9,000.00	9,000.00
Interest	400.00	400.00
Refunds & Misc.	1,000.00	1,000.00
Care Reimbursement	690.00	1,080.00
	$58,590.00	$58,980.00

EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Salary, Exec. Sec.	$ 5,400.00	$ 6,600.00
Salary, other	11,500.00	10,500.00
Social Security	500.00	700.00
Legal & Audit	650.00	1,200.00
Tele. & Telegraph	1,500.00	1,800.00
Office Supp. & Equip.	2,500.00	2,500.00
Dues & Subscriptions	1,500.00	1,500.00
Officers' Travel	2,500.00]	Out of
Physician Travel	2,000.00]	State
		4,500.00
Annual meeting	7,500.00	8,000.00
Public Relations	4,000.00	3,500.00
Rent	3,000.00	3,000.00
Miscellaneous	100.00	100.00
Postage	1,800.00	2,200.00
Legis. Expense	1,500.00	2,200.00
Benevolent Fund	400.00	400.00
Med. School Endowment	200.00	200.00
Ladies Auxiliary	800.00	800.00
Car Expenses	1,800.00	1,100.00
Clinical Pathology	1,000.00	800.00
Staff Travel	4,500.00	4,500.00
Insurance	200.00	100.00
Employment Tax	25.00	25.00
Employee Relations	1,150.00	1,600.00
Reserve	2,565.00	1,155.00
	$58,590.00	$58,980.00

GROUP LIFE INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Premiums	$30,000.00	$30,000.00

GROUP LIFE—EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Payment to Insurance Company	$29,100.00	$29,100.00
Postage	50.00	50.00
Legal & Audit	50.00	50.00
Supplies	50.00	50.00
Balance to Surplus	750.00	750.00
	$30,000.00	$30,000.00

AMA DUES—INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Dues Payments from Doctors	$17,000.00	$18,000.00

AMA DUES—EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Payment to AMA	$17,000.00	$18,000.00

BUILDING FUND—INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Blue Shield Rent	$ 4,800.00	$ 5,100.00
Association Rent	3,000.00	3,000.00
Journal Rent	300.00	300.00
Bd. of Ex. Rent	300.00	600.00
Nurses Assoc. Rent	900.00	1,080.00
OAA Rent	2,250.00	2,400.00
	$11,550.00	$12,480.00

BUILDING FUND—EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Janitor & Repair	$ 1,900.00	$ 2,300.00
Utilities	1,600.00	1,800.00
Interest	2,600.00	2,600.00
Repy. of loans	2,450.00	2,780.00
Legal & Audit	1,000.00	1,000.00
Taxes & Insurance	2,000.00	2,000.00
	$11,550.00	$12,480.00

JOURNAL INCOME

ITEM	Budgeted 1965-66	Proposed 1966-67
Advertising	$18,000.00	$18,000.00
Subscriptions	1,200.00	1,200.00
Miscellaneous	600.00	600.00
Refunds	200.00	500.00
	$20,000.00	$20,300.00

JOURNAL EXPENSES

ITEM	Budgeted 1965-66	Proposed 1966-67
Salary, Editor	$ 1,440.00	$ 720.00
Salary, Staff		2,400.00
Legal & Audit	50.00	50.00
Rent	300.00	300.00
Tele. & Telegraph	175.00	175.00
Social Security		100.00
Office Supplies	17,835.00	16,255.00
Postage	200.00	200.00
Travel		100.00
	$20,000.00	$20,300.00

The Reference Committee recommends acceptance of this portion of the report.

Respectfully submitted,
COMMISSION ON INTERNAL AFFAIRS
D. L. Scheller, M.D., Chairman
Howard Saylor, M.D.
A. P. Reding, M.D.
Jack Hagin, M.D.
Lyle Freimark, M.D.
Richard D. Hockett, M.D.
C. E. Tesar, M.D.
H. J. Stensrud, M.D.
Saul Friefeld, M.D.
C. L. Behrens, M.D.
Bill Hanson, M.D.
C. Rodney Stoltz, M.D.

The Reference Committee recommends acceptance of this Commission report as a whole, with the amendments.

REPORT OF THE COMMISSION ON LEGISLATION AND GOVERNMENTAL RELATIONS

Due to the heavy schedule of Legislative matters facing the Legislative Commission during the past year, many informal meetings of various members were carried out. A full Legislative Commission met in the spring of 1965.

A Legislative summary of the South Dakota State Legislature for 1965-66 was carried in the Grab Bag of February 18, 1966 — #97. Several bills of Medical importance that were handled by the Commission and of note in an annual report, are the following:

House Bill 814; prohibiting physicians from dispensing drugs at a profit, etc., was killed by tabling in committee.

House Bill 781; amended County Hospital law so that the hospital Board may use discretion as to staff privileges when such a hospital is involved in contracting for Federal or State Welfare Programs.

Senate Biill #52; provides immunity from liability for hospital Staff Officers and Medical and Bar Association Committees. The bill passed by both Houses because of importance.

During the past year, the passage and beginning of implementation of the "Medicare Bill" has taken place. Representatives from the Medical Association attended multiple meetings between Government and the Profession in regard to the implementation of this Bill. The results of the tentative rules and regulations to be set forth have been forwarded to all physicians by the State Medical Association.

The Commission wishes to compliment the Executive Staff of the State Medical Association for a monumental job well done, both from the National Legislative standpoint and from the viewpoint of the State Legislative achievements. The Commission also wishes to thank Dr. Robert Bartron, a Member of the Commission for all of the excellent advice and guidance that he gave us during the South Dakota Legislative Session.

Respectfully submitted,
COMMISSION ON LEGISLATION AND GOVERNMENTAL RELATIONS
R. H. Quinn, M.D., Chairman
W. T. Sweeny, M.D.
Russell Orr, M.D.
James Reagan, M.D.
W. R. J. Kilpatrick, M.D.
R. W. Honke, M.D.
R. J. Foley, M.D.
R. J. Bareis, M.D.
C. F. Binder, M.D.
H. R. Wold, M.D.
G. R. Bartron, M.D.
Bill Church, M.D.

The Reference Committee has considered this report and recommends its acceptance as a whole.

REPORT OF THE GRIEVANCE COMMITTEE

The Grievance Committee received a complaint from a woman who said that her doctor had been overcharging her for the past 11 years and that when the bill became quite large, he said he would turn the account over to a collection agency. He also sent the family a letter saying that he was discontinuing medical services to her family. After investigating this complaint, the committee notified the woman that it was not unethical for a physician to turn a long-standing bill over to a collection agency and that notification to the family that he was discontinuing his services to them was most legal and most ethical, as there were other doctors in the immediate community to take care of this family.

The Grievance Committee also received a grievance from a lady stating that a certain doctor was giving too much care to her aged father in a nursing home. Upon investigation of this complaint, we found that the doctor was only visiting the father when he was called upon to do so by the nursing home. The elderly gentleman had developed pneumonitis which necessitated the doctor visiting the patient once or twice a day for about a week. The doctor had his own medicine, gave his own injections, and charged for it. The committee did not feel these charges were excessive and the complainant was so notified.

Respectfully submitted,
GRIEVANCE COMMITTEE
C. J. McDonald, M.D., Chairman
C. Rodney Stoltz, M.D.
Magni Davidson, M.D.
A. A. Lampert, M. D.
R. H. Hayes, M.D.

The Reference Committee considered the report of the Grievance Committee and recommends the acceptance of the report as printed in the Handbook.

REPORT OF THE STATE UTILIZATION AND INSURANCE REVIEW COMMITTEE

Pursuant to the appointment by President Hohm of six members to a state committee, an organizational meeting was held November 17, 1965. Dr. H. Russell Brown outlined the need for, the importance of, and the functions of utilization committees in the implementation of Medicare. It was pointed out that unless the medical profession takes upon itself the function of utilization review, other agencies more political than medical would assume these responsibilities.

The purpose of utilization committees was defined as twofold:

1. Discern and correct both over-utilization and under-utilization of hospital facilities; and
2. Work toward general up-grading of hospital care.

It was further developed that for hospitals with three or more medical staff members, the work of review should be handled by a hospital medical staff committee. A district utilization committee would be formed in each of the districts of the state and would function for those hospitals with only one or two staff members. The district committee in most districts could also serve to review questioned insurance claims involving physicians and hospitals within its jurisdiction.

The hospital utilization committee would follow certain definite lines:

Have specific authority and limitations of authority;

Be representative of the entire scope of medical practice;

Utilize the services of the hospital administration staff and the record library staff;

Review a representative sampling of all cases, and identify and analyze patterns of patient care;

Have regular meetings and regular reports;

Utilization review is clearly a function and responsibility of the medical staff of each hospital.

On January 9, 1966, an interim report of progress and developments was made to the Council of the South Dakota State Medical Association.

On January 22, 1966, a second meeting of the state utilization and insurance review committee was held. More definite and detailed guidelines for the development and function of local and district committees were outlined. To date, each of the districts has appointed or elected a district utilization committee. The development of local (hospital) utilization committees is proceeding apace.

During the month of February, meetings of hospital administrators with representatives of the State Department of Health and of Blue Cross have resulted in action by hospitals of the state to submit to the State Department of Health proposals for utilization review under a regimen outlined by Blue Cross. These proposals may or may not be in accord with the sentiments of the state utilization and insurance review committee. The ultimate roles of the medical profession, the insurance carriers, the State Department of Health and the Department of Health, Education, and Welfare in the supervision of utilization are not yet to be determined.

Respectfully submitted,
STATE UTILIZATION AND
INSURANCE REVIEW COMMITTEE
H. R. Wold, M.D., Chairman
E. S. Palmerton, M.D.
Roscoe Dean, M.D.
William Taylor, M.D.
Frank J. Tobin, M.D.
E. W. Sanderson, M.D.

The Reference Committee considered the report of the State Utilization and Insurance Review Committee and recommends the acceptance of this report.

COUNCIL MEETING

Saturday - April 2, 1966
Sheraton Cataract Hotel
Sioux Falls, South Dakota

The meeting was called to order by J. T. Elston, M.D., Chairman. Those present for roll call were Drs. Paul Hohm, J. J. Stransky, A. P. Reding, J. P. Steele, E. J. Perry, M. C. Tank, A. J. Tieszen, Fred Leigh, H. R. Lewis, E. T. Lietzke, C. F. Johnson, J. T. Elston, H. E. Lowe; Commission chairmen — G. W. Knabe, Jr., J. B. Gregg, R. H. Quinn, and D. L. Scheller: Also present were Dr. D. Max Reade, Dr. Karl Wegner, Dr. H. Russell Brown, Dr. Bill Church, Mr. Jim Rosevear, Mr. Dallas Whaley, Mr. Richard C. Erickson, and Mr. Randall R. Tuffs.

Dr. Perry moved that the reading of the minutes of the previous meeting be dispensed with inasmuch as they have been published. Motion was seconded by Dr. Reding and carried.

OLD BUSINESS

Mr. Erickson reported on the tax exemption situation on the building. He indicated the hearing before the Supreme Court will be held April 5.

Mr. Erickson reported on the building changes which are being made now to accommodate the new programs.

Mr. Erickson reported that the annual meeting arrangements are progressing in a satisfactory manner.

COMMISSION REPORTS

REPORT OF THE COMMISSION ON MEDICAL SERVICE

There has been no formal meeting of this Commission since the last Council meeting, the few items of business which did come up having been handled by correspondence. The following items are reported:

1. Doctor J. A. Anderson is attending a National meeting on Rural Health in mid-March.
2. The Medical School Affairs Committee of the Commission on Medical Service makes the following report:
   a. The 1966 South Dakota State Legislature has approved for next year's Legislature, the appropriation of matching funds for the Medical School expansion program previously discussed by Dean Walter Hard, before the Council. It is recommended that the Legislative Commission follow up the 'provisional' appropriation for Medical School expansion.
   b. Dean Walter Hard has been named Chairman of the Heart-Cancer-Stroke Planning Committee in South Dakota and has called a meeting of a Planning Committee to be held in Huron on March 12, 1966.
   c. The Preceptorship Program of the Medical School will again be in operation at the time of the next State Medical meeting. The Preceptors will be urged to attend the meeting in Huron with their students, as was done last year. However, it is hoped that there will be more response this year on the part of the Preceptors with a better attendance.
   d. It is brought to the attention of the Council that there are now thirteen interns in the two Sioux Falls hospitals. Some of the present interns are graduates of the School of Medicine, USD. The internship matching program for 1966-67 is now in progress. It is hoped that there will again be as many interns in the coming year. The intern programs are one means of interesting young physicians in South Dakota as a place to practice.
3. The Chairman of the Commission was asked to investigate the subject of and to present thoughts relating to the matter of "emergency room" service in hospitals. A report of this investigation is attached herewith. An opinion and recommendations as to policy to be adopted in this State, by the Council, has been requested.

J. B. Gregg, M.D., Chairman

John B. Gregg, M.D.
318-D West 18th Street
Sioux Falls, South Dakota 57104
March 11, 1966

Mr. Richard C. Erickson
South Dakota State Medical Association
711 North Lake Avenue
Sioux Falls, South Dakota 57104

Dear Mr. Erickson:

It has been requested that I communicate with you concerning the subject of the "emergency room" service in hospitals. This is a situation which is already being felt in some communities of this State, and one which is going to assume an even larger status very soon when the Medicare Program becomes effective. An ambiguous proposal from the Joint Commission on Accreditation of Hospitals relating to the availability of the physician on call for the outpatient department within 15 minutes of the time that an "emergency" is brought to the hospital, was discussed at the last meeting of the Council of the South Dakota State Medical Association. Clarification of this matter will be sought at the next annual meeting of the AMA through a resolution to be presented by the South Dakota delegation.

The hospital outpatient department problem has several potentially very dangerous ramifications which should be brought to the attention of the physicians of this State. Some of the more important points of the problem which should be the subject of discussion and clarification on a State level are: 1) A careful study has shown that in an average hospital "emergency room," only about one third of the patient visits could be classified as "necessary," "Two thirds of the patients could have been treated in the physician's office." 2) According to SECTION V of PRINCIPLES OF MEDICAL ETHICS of the American Medical Association, "A physician may choose whom he will serve. In an emergency, however, he should render service to the best of his ability." When he is forced by obligatory participation in "emergency room" calls of a hospital to treat or be responsible for patients, most of which are of questionable emergency, this privilege is taken from him. 3) In SECTION VI of the PRINCIPLES OF MEDICAL ETHICS it is stated, "A physician should not dispose of his services under terms or conditions which tend to interfere with or impair the free and complete exercise of his medical judgment and skill or tend to cause a deterioration of the quality of medical care." Mandatory call in the "emergency room" by all members of the medical staff, despite background, experience, and personal preferences, does not promote the quality of medical care of the patient. This is especially true in the case of persons who are limited in their practices or engaged in specialty practices. Mandatory participation in the "emergency room" activities as a condition for hospital staff membership or hospital privileges entails a large factor of coercion, tending to abrogate SECTIONS V and VI of the PRINCIPLES OF MEDICAL ETHICS.

4) Many malpractice insurance policies do not cover the physician when he takes or is forced to take calls in an emergency department or participates in an emergency function of the hospital. An additional rider and premium for the malpractice insurance is needed to cover this situation in several companies.

5) Despite the fact that the physician who is on call may never have seen or treated a certain patient in the "emergency room" or elsewhere, having referred him to another physician for disposition, the person on call is still legally liable and subject to the possibility of being enjoined in a lawsuit, should there be inauspicious results of therapy by the treating physician.

6) On at least one occasion already, in a community of this State, a physician, member of a hospital staff in good standing, was subject to critical interrogation by an Administrative Assistant of the hospital concerning unexpected "emergency room" call, on 48 hours notice. It is indeed a sad commentary when a practicing physician is put into the position of having to account for his time to a hospital administrator.

Several very excellent voluntary staff sponsored plans for coverage of the outpatient departments and "emergency room" have been developed in the past four years. In the majority of instances the outpatient department, including the "emergency room" can be handled most adequately without resort to obligatory measures to provide coverage.

There is no doubt that the outpatient department of the hospital is going to assume an increasingly important role in the near future. The individual physicians and the medical staffs of the hospitals are the ones who must develop programs for this service. If they do not do so spontaneously, it is very likely that these functions will be thrust upon them. Some guidelines are needed for the members of the hospital staffs relating to their responsibility, privileges, and rights, in the outpatient and "emergency room" programs, which to a large extent are becoming more a function of the hospitals than of the medical staff. The South Dakota State Medical Association should adopt a philosophy and take a stand as to the viewpoint of the physicians of this State regarding this problem. The attention of the Council of the South Dakota State Medical Association is invited to this matter.

J. B. Gregg, M.D., Chairman
Commission on Medical Service

REFERENCES:

1) Kluge, D. N., Wegryn, R. L., and Lemley, B. R., the Expanding Emergency Department, **J.A.M.A.,** 191:801-805, March 8, 1965.
2) A. Letter dated October 7, 1965, from Mr. Richard C. Erickson, Executive Secretary, South Dakota State Medical Association, to all members of the South Dakota State Medical Association with information concerning PRINCIPLES OF MEDICAL ETHICS of the AMA.
2) B. Law Department, First Results: 1963 Professional-Liability Survey, **J.A.M.A.,** 189: 859-966, September 14, 1964.
3) Abbott, V. C., Emergency Department Staffing, Five-Year Experience With The Pontiac Plan, Bulletin, American College of Surgeons. January-February 1966, pp. 11-12.
4) Fahey, J. M., Six Ways to Deal With The Emergency Room Crisis, **Medical Economics,** November 30, 1964, pp. 65-103.
5) BARBIRE v. WRY, 183, A. 20 142 (N. J., June 26, 1962).
6) Letter dated January 28, 1966, from the LAW DEPARTMENT, AMA, to Mrs. Clark Butler, Administrative Assistant, South Dakota State Medical Association, with enclosure.
7) BETTER CHECK YOUR MALPRACTICE INSURANCE, DOCTOR'S BUSINESS COLUMN, **Medical World News,** March 4, 1966, p. 132.
8) EMERGENCY ROOM COVERAGE CAN BE LEGAL DYNAMITE, CHAS. U. LETOURNEAU, **Medical Economics.**
9) TRENDS IN MALPRACTICE, **Medical Economics,** Sept. 20, 1965, p. 139.
10) EMERGENCY ROOM STAFFING, Doctor's Business Column, **Medical World News,** February 11, 1966, p. 146.
11) Conditions for Hospital Participation-Continued, MEDICARE INFORMATION AMA Advisory Committee on Public Law 89-97 (Medicare) and Public Law 89-239 (Regional Programs on Heart Disease, Cancer and Stroke), Report No. 10, SECTION XIII OUTPATIENT DEPARTMENT, AND SECTION XIV EMERGENCY SERVICE OR DEPARTMENT.

Dr. J. B. Gregg, chairman of the Commission on Medical Service, discussed his report and pointed out some of the problems concerning the staffing of "emergency rooms." It was the concensus that the Council could not suggest a definite policy inasmuch as it was a hospital staff problem and should be solved on a local level. It was recommended that

each individual hospital staff be sure that they are supplied with adequate coverage and that they be informed of the possibility of malpractice suits.

Dr. Hohm reported that Dean Walter Hard had been named as Chairman of the Heart Disease, Cancer and Stroke Planning Committee and that application for a planning grant would be made in the near future. Dr. Tank moved to accept this report, seconded by Dr. Johnson and carried.

REPORT OF THE COMMISSION ON INTERNAL AFFAIRS

The Commission on Internal Affairs met at the Medical Association Building on September 11, 1965. The members present were Drs. H. L. Saylor, H. J. Stensrud, William Hanson, J. C. Hagin, A. P. Reding, C. Rodney Stoltz, C. E. Tesar and D. L. Scheller, chairman.

A discussion was held on Resolution #4 submitted by the 9th District Medical Society. This resolution would abolish the House of Delegates and expand the Council to one Councilor for each fifty members. Through the passage of this resolution all the business of the Association would be carried on by the Councilors and officers of the Association at their four yearly Council meetings.

The Commission studied this resolution carefully and decided that it was not in the best interests of the Association because it potentially concentrates too much power in the hands of too few people.

The Commission after careful study recommended that Resolution #3 submitted by the Seventh District, be acted on favorably, excluding not only the Councilors but also the officers of the State Association as voting members of the House of Delegates unless they are specifically delegated by their District Medical Society as a delegate or alternate delegate.

It was further recommended that only delegates or alternates, certified in writing by the Secretary of the District Medical Society and accepted by the Committee on Credentials, be seated at the sessions of the House.

It was also recommended that the Speaker of the House of Delegates appoint all Reference Committees of the House of Delegates and notify the appointees in writing not less than thirty days prior to the date of the annual meeting.

It was also recommended that to implement Resolution #3, the By-Laws be changed by eliminating that portion of Article 6, Section 2, on "Composition" starting with "and, (2)" deleting the remainder of this section, which will then read:

Section 2. Composition

The House of Delegates will be composed of (1) delegates elected by the component societies, each component society being entitled to elect one delegate for each 20 active and life members in good standing, or fraction thereof, who enjoy all the rights and privileges of membership, provided each component society shall be entitled to elect at least one delegate.

It was recommended that the publication of the code of "Medical Ethics" be sent to every doctor in the State, rather than just the members of the Association.

The Commission considered the feasibility of a central billing system for State and local dues through the Association office. It was recommended that until better facilities are available, central billing should not be done through the central office but be left to the District Medical Societies.

REPORT OF THE COMMISSION ON SCIENTIFIC MEDICINE

The Commission met March 12, from 1:00 to 4:00 P.M. at the executive office of the Association in Sioux Falls. Present were Drs. E. H. Heinrichs, R. B. Leander, R. E. Nelson, C. F. Johnson and G. W. Knabe, Jr. and Mr. R. C. Erickson and Mrs. P. Butler. Dr. B. C. Lushbough was delegated to attend a concurrent conference on regional health centers in Huron.

1. **Annual Meeting:** The Program format and plan for conducting the annual meeting prepared in conjunction with the executive office was reviewed and approved. Some specialty society program information is still pending. An Aesculapius Award of $200 and a certificate for the most outstanding scientific exhibit will be sponsored by Mead Johnson Laboratories. The Program Committee (Commission on Scientific Medicine) will select the award-receiving exhibit on Monday, May 23rd.
2. **Mental Retardation:** "Space for the Mentally Retarded in South Dakota," the final report of the South Dakota Comprehensive Planning for Mental Retardation of December 31, 1965, makes certain recommendations for action by SDSMA. Because of the volume of information and complexity of action required in this field, Dr. E. H. Heinrichs was appointed to develop an ad hoc Committee on Mental Retardation to assist the Commission in its work.
3. **Mental Health:** Commission member Dr. R. S. Jones will attend the 12th Annual AMA Meeting of State Mental Health Representatives, March 18-19, 1966. Because of the volume of work in this field, Dr. R. B. Leander was appointed to organize an ad hoc Committee on Mental Health to assist the Commission in its work.
4. **Tuberculosis:** The medical association's recommendations for implementation of the Tuberculosis Control and Treatment Law of 1963 has been favorably received by the State Health Department but there has been no action on them. Therefore, an inquiry will be directed to the Health Department regarding the present status of the program and also of a Commission-proposed joint meeting with the Health Department.
5. **Other Programs:** Continuing inquiry is being made concerning establishment of a Governor's Committee on Aging. Dr. C. F. Johnson reports that Venereal Disease is decreasing in incidence. Nevertheless, the Commission will offer guidance to District Societies on conducting anti-V.D. programs. Similarly, Dr. S. W. Fox is developing plans for SDSMA guidance in organizing local diabetes detection programs.
6. **Next Commission Meeting** will be Saturday, April 16, at 1:00 P.M. at the executive office of SDSMA in Sioux Falls.

Respectfully submitted,
George W. Knabe, Jr., M.D.
Chairman

Dr. G. W. Knabe, Jr., chairman, of the Commission on Scientific Medicine suggested another notice be sent out concerning workshops at the annual meeting. Dr. Perry moved the report be accepted, seconded by Dr. Leigh and carried.

Dr. C. L. Vogele, chairman, Commission on Communications, submitted no report.

NEW BUSINESS

The following physicians were nominated for recommendation to the Governor for appointment to the Board of Medical and Osteopathic Examiners: J. W. Donahoe, M.D.; G. W. Knabe, Jr., M.D.; and B. F. King, M.D. Dr. Hohm moved nominations cease and the Governor be informed that J. W. Donahoe, M.D., is the Council's first choice. Motion was seconded by Dr. Reding and carried.

Dr. J. B. Gregg and Mr. Erickson discussed making Cancer a reportable disease. Dr. Hohm moved we inform the South Dakota Chapter of the American Cancer Society that we do not believe that Cancer should be a reportable disease. Dr. Perry seconded the motion and it carried. Dr. Gregg stated he would convey the message to Mrs. Dory.

Mr. Erickson discussed the request for a donation to the Adult Education Center at Vermillion. Dr. Perry moved that due to the established policy of the South Dakota State Medical Association, we not make a contribution. Motion seconded by Dr. Hohm and carried.

Dr. Bill Church introduced Mr. Jim Rosevear from AMPAC.

STATEMENT TO COUNCIL OF SOUTH DAKOTA STATE MEDICAL ASSOCIATION

James W. Rosevear
AMPAC Field Representative
April 2, 1966

Five short years ago the American Medical Association founded AMPAC (American Medical Political Action Committee), appointed and annually continues to appoint its board of directors. Back there in 1961 the AMA Board of Trustees presented the first AMPAC Board with an urgent directive. In effect, the charge said, ". . . get into the business of political support to our friends in and out of Congress without delay and reach every physician and physician's wife in our states to help them understand the vital importance of political involvement by organized medicine." Shortly after this AMA pronouncement, one state medical association after another established their own medical political action committee and began implementing a political action program as an arm of their state medical society.

Together, we face a new and extremely important Congressional election later this year, and this is probably an opportune time to take stock of ourselves and explore what it is we have accomplished. Actually, a great deal has happened to the PAC movement. Let us take a moment to look at the list of accomplishments physicians and their wives have made under the unified strength of AMPAC and state PACs.

First, every one of our states now has a medical political action committee of varying effectiveness depending on their closeness to their own state medical society.

Secondly, AMPAC membership, although we will probably never be satisfied has steadily increased. This year we expect our national membership to double what it was in 1965, and our goal is to see it triple.

Then, we have been instrumental in electing Congressmen, and after all, this is final objective of SoDaPAC and AMPAC. Those who we have had the privilege of supporting can be found among the ranks of both Democrats and Republicans. The only criteria used by the PAC movement in determining who shall receive our support is based on how well they understand and appreciate the problems and needs of the medical profession. Who decides this? The PAC boards with the advice and counsel of groups such as this one. In addition, this movement has been effective in electing our friends to the Congress by applying the realistic yardstick of "can we win in a particular district." Our batting average is high and percentage wise, it rivals our opponents (COPE).

The two major political parties in this country now recognize and respect the results we have achieved and the untapped potential of our influence within the political arena. Understandably, our political friends were cautious with this new movement at first, but have come to regard the organization nationally and in the states as one that can get the job done without upsetting established party leadership.

These are only some of the gains you have made over the past five years, but surely they are only beginning. There is more, much more all of us can and must do to fulfill our professional and civic responsibility to the political system in this country, keeping in mind the ultimate goal of preserving the free practice of medicine in a free society.

South Dakota was one of the early states to organize its medical political action committee (SoDaPAC) and I am sure you share with us at AMPAC the pride of its accomplishments. In addition to earning the respect of many political professionals in this state, SoDaPAC, has built its membership to second in the nation. I assure you, that you have in SoDaPAC, an organization which, with your guidance, can be an even more effective political force on behalf of organized medicine in South Dakota, but I want to emphasize that word "guidance."

AMPAC is strong and effective because the support, cooperation and liaison from the AMA is equally as strong and effective. I know of no state in this nation with a strong PAC that doesn't have this type of indirect support from its own state society. After all, AMPAC is separate from the AMA only because it is a requirement of Federal Law, and yet the closeness of the two organizations is jealously preserved in many ways, not the least of which is the annual appointment of the AMPAC Board Members by the AMA Board of Trustees. In addition, the AMA can and does support AMPAC through corporate contributions which we may use to operate most of our administrative and educational programs. However, these funds cannot be used for political action.

I cannot over emphasize the importance of the State Medical Society Council initiating a form of indirect supervision over the activities of its medical political action committee by annually electing physicians to serve on the PAC Board. Most state medical societies in the country have done this and it has served to strengthen medical political action in those states. Your appointment of SoDaPAC's 1966 Board of Directors would be a very important step which you could take to insure an indirect but supporting relationship with SoDaPAC, thereby provide this organization with the liaison and counsel it so desperately needs to continue to adequately represent your state medical society. Alone and apart from you, or from any state medical society, the state PAC cannot accurately and enthusiastically support your interests.

There are, to be sure, other ways you can express your support to medical political action in South Dakota, but the experience of the AMA-AMPAC and other states provide living proof that the first step in this direction is the decision to annually appoint your SoDaPAC Board members.

Two-thirds of the members currently sitting in the 89th Congress are there because they received support from the AFL-CIO's COPE. The medical political action movement can and must provide a balance to this ledger. The challenge to us all, is great. The alternative is complete control of organized medicine by the Government. The job, our job, is enormous but I assure you that medicine has risen to the occasion. I ask your continued support and respectfully request that you act favorably on our recommendation to assume the responsibility of electing this and succeeding SoDaPAC Board members and permitting SoDaPAC the luxury of conferring with this Council.

On behalf of the AMPAC Board of Directors, I want to say how much I appreciate the opportunity you have given me to be with you today. AMPAC appreciates your support. Many of our friends in Congress, if they could be here today, would express a similar statement of appreciation. Thank you.

Mr. Rosevear discussed AMPAC and SoDaPAC and asked that the Council appoint the Board of Directors for SoDaPAC. He also requested financial help from the Association for educational activities.

Dr. Church read a letter to the Council.

STATEMENT TO COUNCIL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION

Bill G. Church, M.D.
Chairman of SoDaPAC
April 2, 1966

As Mr. Rosevear pointed out to you, two-thirds of the present members of Congress are sitting in Washington because COPE put them there. We here in South Dakota are fortunate that three of our four representatives in Congress are on our side. But this picture could change. After all, a Senate seat from South Dakota is just as valuable as a Senate seat from any other state, and it is a lot cheaper to obtain that seat in South Dakota than in some of the more populous states. And COPE knows this. Even though organized labor has not in the past been a really powerful political influence in South Dakota, there is evidence that they are expanding and increasing their activities even in some of our smaller communities, that they intend to make their influence felt in the towns, cities, and counties, as well as on the state

and national level. To do this, they are preparing voter registration lists, organizing block workers, lining up poll watchers, baby sitters and car drivers to make sure that everyone on their side of the political fence gets to the polls on election day. COPE is methodically and purposefully planning to defeat Ben Reifel, E. Y. Berry and Karl Mundt, men who have been steadfast in their stand against any legislation that might lead to socialized medicine.

Because COPE is making this concentrated effort, and because they must not succeed in defeating our friends in local, state and national political offices, it is imperative that we as physicians do everything in our power to give aid and support to those candidates, who uphold our political principles. We need the aid and support of our wives, our employees, and our friends. We need **money.** And this is where the State Medical Association, as an organization, can be of the most help. In fact, financial backing by the Association is vital to the continued growth and development of the PAC movement within our State.

You have already seen the brief summary of our financial statement, so you know where our money comes from and what we have been doing with that money. What you may not know is that SoDaPAC, like COPE, was organized, legally speaking, so that we would be able to take full advantage of the tax laws, regarding political **education** and **political action.** The law makes a distinction between the two, as you know, and those dollars spent for political education **may** come from corporations, such as SDSMA, and are tax deductible. In the political action field we call those dollars "soft dollars." "Soft" dollars, then, are used for educational and administrative purposes. In contrast to these are "Hard" dollars. "Hard" dollars are not tax deductible, can not come from corporations, but **can** be used for direct support of the candidate. Now, what all this means for us here today is this: Up until this time, all of the money spent by SoDaPAC has come from membership dues. Every penny of that money could **legally** have been spent for candidate support. But since this support is only part of the purpose of SoDaPAC, we on the Board have found it necessary to spend those hard dollars for such things as stationery, telephone calls, secretarial help, printing costs, in short, all of the administrative expenses that go with a state-wide organization of any kind. In addition to these daily expenses, we also had to spend money for our annual banquet. In the area of education, we are publishing a monthly news letter to keep our members informed about current issues that need their attention. Right now, we are busy planning an all day workshop which will be held in Sioux Falls next month. All of these things are important and necessary if we are going to do an effective job of teaching and encouraging our members to be politically active. And all of these things cost money. But **all** of these things could be paid for with "soft" dollars — dollars from the SDSMA!! And they should be. We feel, as Mr. Rosevear pointed out that SoDaPAC should not be isolated and separated from the SDSMA. In at least two areas, we earnestly solicit your advice and assistance. In the first place, in almost all of the other states with active PAC movements, the State Medical Association selects the State PAC Board members. Ideally, this Board should consist of one member from each District, a woman to represent the Auxiliary, and one member to represent the Allied professions. That is the first responsibility we are asking you to take. The second, of course, is financial. Here, I want to make it clear that any amount of money appropriated by the Association for administrative and educational purposes will automatically free that same amount for candidate support.

As Dr. Frank Coleman, Chairman of the AMPAC Board of Directors, pointed out in a speech before the AMA House of Delegates, "AMPAC is separate from the AMA only as the arm is separate from the body." This is the kind of relationship that SoDaPAC should have with the SDSMA, and it is the kind of relationship we are asking you to help us create. Only in this way can we really be certain that our efforts truly reflect the intentions of the members of the medical association, and therein lies our real strength. In my opinion, this liaison is absolutely essential if we are to continue to grow toward a really effective political force within the state of South Dakota.

FINANCIAL RECORD SoDaPAC 1962-1965

1962		
Receipts		
Balance brought forward	$ 676.03	
AMPAC	5,000.00	
Contributions and Dues	13,597.00	
Total		$19,273.03
Expenditures		
Political Contributions	8,950.00	
Dues forwarded to AMPAC	1,927.00	
Political Advertising	2,157.16	
Printing	1,662.65	
Zimmer, attorney fees	3,300.00	
Operating Expenses	1,132.01	
Total		19,128.82
Balance December 31, 1962		144.21
1963		
Receipts		
Balance brought forward	144.21	
SoDaPAC and AMPAC dues	2,954.00	
Total		3,098.21
Expenditures		
Dues forwarded to AMPAC	1,399.00	
Zimmer, attorney fees	1,350.00	
Operating expenses	266.15	
Total		2,975.15
Balance December 31, 1963		123.06
1964		
Balance brought forward	123.06	
SoDaPAC and AMPAC dues	3,995.00	
Total		4,118.06
Expenditures		
Dues forwarded to AMPAC	1,630.00	
Political contributions	1,200.00	
Zimmer, attorney fees	800.00	
Operating expenses	210.72	
Total		3,840.72
Balance December 31, 1964		277.34
1965		
Receipts		
Balance brought forward	277.34	
SoDaPAC and AMPAC dues	2,935.00	
Annual banquet tickets	490.00	
Total		3,702.34
Expenditures		
Dues forwarded to AMPAC	1,460.00	
Annual banquet	650.52	
Operating expenses	174.69	
Total		3,702.34
Balance December 31, 1965		1,417.13

Dr. Church stated that a contribution of $700 to $1,000 from the Association would be greatly appreciated. Dr. Stransky moved that tentative approval of the requests be granted, subject to confirmation by the House of Delegates; that $500 be given to SoDaPAC for the current year, with the understanding that approval of future endorsement by the House of Delegates at the annual meeting will be requested by a resolution from the Council. The Councilors were asked to suggest the name of a physician from each District who would be interested in serving on the Board of SoDaPAC.

Mr. Whaley discussed the Committee for Government of the People.

American Medical Association
Division of Field Service
535 North Dearborn Street
Chicago, Illinois 60610

Mr. Richard C. Erickson
Executive Secretary
South Dakota State Medical Association
711 North Lake Avenue
Sioux Falls, South Dakota 57104

Dear Dick:

I talked to Randy Tuffs at the Medicare meeting in Chicago and gave him a brief summary of some work that is being done on the national Committee for Government of the People. This is a newly formed Committee, and they are seeking ten well known personages from each state to form a master committee of 500. Their primary purpose, as explained in the pamphlets, which will be sent to you under separate cover, is to secure the passage of the constitutional amendment which will allow states to elect one of their legislative bodies other than by reapportionment. Perhaps your state has already done some work on this, and your Society is planning to nominate a physician or two to serve on South Dakota's Committee. If you are planning something of this nature or working with this group, I would appreciate any information that you might pass on to me. The pamphlets are available in quantity for mass distribution to your members and may be obtained by writing to:

Committee for Government of the People
733 15th Street, N.W.
Washington, D. C.

Also, we would like to get a nose count on your legislators, both House and Senate, as to your best "guestimate" as to their willingness to vote on the constitutional amendment being sponsored by Senator Everett Dirksen. Any information along this line that you can pass on would be helpful. We are trying to gather information on this within the next week or so.

Thank you for your help and I'll look forward to our next visit.

Sincerely,
Dallas F. Whaley
Field Representative

Mr. Erickson discussed the objection to sending out pamphlets on this subject. Dr. Hohm moved the policy of sending out information be continued and be marked "for your information." Seconded by Dr. Reding and carried.

Mr. Erickson discussed the recruitment of physicians in South Dakota. Dr. Perry moved that the problem of reciprocity with the Basic Science Board be referred to the Commission on Medical Service for study. Dr. Gregg was to find out the status of the Law and if we can obtain reciprocity with the National Board of Basic Science. The motion was seconded by Dr. Steele and carried.

Dr. Steele moved that the request from SAMA for an increase of travel donation for the next two years from $100 to $200 be approved. Motion seconded by Dr. Leigh and carried.

Dr. D. Max Reade discussed the Yankton District's Public Relations Program. After a lengthy discussion, Dr. Stransky moved that the Councilors go back to their Districts and talk with them about the advisability of instituting a Public Relations Program with no specific program indicated and that we convey this information back to the State office by May 1; that in the meantime the Yankton District material should be sent to the American Medical Association for study and their opinion sent to the Councilors, and the Executive Committee will decide on the details of the program. Dr. Tieszen seconded the motion and it carried.

Dr. Steele moved that the State Association should pay for the program ($4,000 total cost) if it is approved; that the Executive Committee be given the authority to expend the necessary funds. Seconded by Dr. Johnson and carried.

Dr. Reding discussed the proposed increase in AMA dues. Dr. Hohm moved that the Council instruct the delegate and alternate to vote in favor of the suggested increase in dues at the AMA annual meeting. The motion was seconded by Dr. Perry and carried.

Dr. Steele and Dr. Wegner reported on the survey of the Radiology and Pathology Societies and requested that the phrase "defined as unethical and" be reinstated in the resolution passed in January, 1966, to read as follows:

SOUTH DAKOTA STATE MEDICAL ASSOCIATION
Resolution of the Council
Adopted January 8, 1966

Whereas, radiology and pathology constitute an integral part of the practice of medicine, and radiologists and pathologists are physicians, practicing a specialty in medicine in the same way as surgeons, internists, and other specialists; and

Whereas, radiologists and pathologists in a hospital must be members of the medical staff, with the same qualifications, rights, privileges, duties and responsibilities as other physician members of the medical staff; and

Whereas, any arrangement or contract. under which a radiologist or pathologist, or any other physician pools his professional fee with hospital charges tends to identify that physician as a part of hospital service and places him in the category of a hospital employee; and

Whereas, any such arrangement between hospital and physician conceals from the patient and the public the professional fee of the physician, and the charge of the hospital for facilities, supplies, technical and auxiliary personnel, and the patient has the right to know who is being paid for what; and

Whereas, such a contractual arrangement tends to eliminate competition between physicians based upon proficiency and quality of service to patients, and substitutes competition for hospital contracts based upon a willingness to accept hospital dictated terms, which is a form of solicitation of patients; and

Whereas, inclusion of the professional service of radiologists and pathologists, as hospital services constitutes a serious threat towards the ultimate inclusion of all physician specialists as hospital-based hospital employees; and

Whereas, the House of Delegates of the American Medical Association has, on many occasions, stated as a principle that "A physician should not dispose of his professional attainments or service to any hospital, corporation, or lay board by whatever name called, or however organized under terms or conditions which permit the sale of the service of that physician by such agency for a fee;" and

Whereas, Public Law 89-97, Medicare, makes it mandatory that no physician's professional fee be included under the Hospital Service Component, Part A., of the Law; and

Whereas, this necessitates separate billing of radiologists and pathologists professional fees from that of the Hospital Service Component in the radiological and pathological services on Medicare patients; and

Whereas, having a different billing system for Medicare than for non-Medicare patients would result in confusion, and a uniform method of handling all radiological and pathological billing is preferred; and

Whereas, this system of separate billing has been tried and has been in effect in a number of hospitals for years including some university hospitals and has proven itself to be a most satisfactory system; and

Whereas, the American College of Radiology did, on October 1, 1965, adopt the policy of separate billing by radiologists; and

Whereas, on October 3, 1965, the House of Delegates of the American Medical Association adopted this policy of separate billing by all physicians as follows:

> "Hospital-based medical specialists are engaged in the practice of medicine. The fees for services of such specialists should not be merged with hospital charges. The charges for the services of such specialists should be established, billed and collected by the medical specialist in the same manner as are the fees of other physicians. The

American Medical Association intends to continue vigorously its efforts to prevent inclusion in the future of the professional services of any practicing physician in the hospital service portion of any health care legislation."

Therefore, be it Resolved, that the South Dakota State Medical Association define as unethical and make known its disapproval of any contract or other arrangement whereby a physician merges his professional fee with hospital charges; and further

Be it Resolved, that the charges for the services of hospital-based medical specialists should be established, billed, and collected, by the medical specialists in the same manner as are the fees of other physicians.

Dr. Perry moved that the words "defined as unethical and" be reinstated; seconded by Dr. Johnson and carried.

Dr. H. Russell Brown and Mr. Erickson and Mr. Randall Tuffs discussed the Medicare program.

Meeting adjourned at 5:30 P.M.

DISTINGUISHED SERVICE AWARDS

Started in 1951—T. F. Riggs, M.D., Pierre (deceased)
1952—H. Russell Brown, M.D., Watertown
1953—Guy Van Demark, M.D., Sioux Falls (deceased)
1954—J. C. Ohlmacher, M.D., Vermillion (deceased)
1955—R. G. Mayer, M.D., Aberdeen (deceased)
1956—J. C. Ohlmacher, M.D., Vermillion (deceased)
1957—W. E. Donahoe, M.D., Sioux Falls
1958—Drs. J. C. Hagin, M. W. Pangburn (deceased), and James DeGeest, Miller
1958—J. F. Brenckle, M.D., Superior, Wisc. (deceased)
1958—Mrs. Agnes Holdridge, Madison
1959—Walter L. Hard, Ph.D., Vermillion
1959—Rev. and Mrs. Robert O. Bates, Sturgis
1959—R. M. Kilgard, M.D., Watertown (deceased)
1960—L. J. Pankow, M.D., Sioux Falls
1961—Gregg M. Evans, Ph.D., Custer
1962—Edwin Shaw, Ph.D., Vermillion
1963—Arthur A. Lampert, M.D., Rapid City
1964—John C. Foster, Phoenix, Arizona
1965—A. P. Reding, M.D., Marion
1966—Mrs. C. Rodney Stoltz, Watertown

FIFTY YEAR CLUB MEMBERS

C. V. Auld, M.D., Plankinton
Myrtle Carney, M.D., Ft. Worth, Texas
J. C. Clark, M.D., Sioux Falls (deceased)
F. L. Class, M.D., Huron (deceased)
M. E. Cogswell, M.D., Wolsey (deceased)
J. Cook, M.D., Bonesteel (deceased)
Harold L. Crane, M.D., Avon, Conn.
S. A. Donahoe, M.D., Sioux Falls (deceased)
W. E. Donahoe, M.D., Sioux Falls
V. W. Embree, M.D., Pierre
W. D. Farrell, M.D., Aberdeen (deceased)
R. B. Fleeger, M.D., Lead (deceased)
R. R. Fisk, M.D., Flandreau (deceased)
F. W. Freyberg, M.D., Mitchell
E. E. Gage, M.D., Sioux Falls (deceased)
E. H. Grove, M.D., Arlington (deceased)
Lyle Hare, M.D., Spearfish
J. A. Hohf, M.D., Yankton (deceased)
F. S. Howe, M.D., Deadwood (deceased)
A. H. Hoyne, M.D., Salem (deceased)
A. S. Jackson, M.D., Rapid City
R. J. Jackson, M.D., Hot Springs (deceased)
J. A. Jacotel, M.D., Milbank (deceased)
G. T. Jordan, M.D., Vermillion (deceased)
F. F. Keene, M.D., Wessington Springs (deceased)
B. C. Murdy, M.D., Aberdeen
N. T. Owen, M.D., Rapid City (deceased)
L. L. Parke, M.D., Canton
M. O. Pemberton, M.D., Deadwood (deceased)
R. J. Quinn, M.D., Sioux Falls
T. B. Ranney, M.D., Aberdeen (deceased)
T. F. Riggs, M.D., Pierre (deceased)
H. L. Saylor, M.D., Huron (deceased)
F. W. Valkenaar, M.D., Chancellor
G. E. Van Demark, M.D., Sioux Falls (deceased)
H. P. Volin, M.D., Lennox
C. H. Weishaar, M.D., Huron (deceased)
J. R. Westaby, M.D., Madison
G. E. Zimmerman, M.D., Missoula, Montana

COMMUNITY SERVICE AWARD

1961—R. A. Buchanan, M.D., Huron
1962—Roland F. Hubner, M.D., Yankton
1963—George W. Mills, M.D., Wall
1964—John C. Hagin, M.D., Miller
1965—Alonzo P. Peeke, M.D., Volga
1966—Hugo C. Andre, M.D., Vermillion

AESCULAPIUS AWARD

1966—Paul R. Leon, M.D.
Walter Miller, M.D., Aberdeen

South Dakota State Medical Association Roster — 1966
Membership by Districts

ABERDEEN
DISTRICT No. 1

Pres., Paul Leon, M.D.
Sec., William Taylor, M.D.

*Alway, J. D. ..... Arizona
Avotins, R. ..... Faulkton
Berzins, R. ..... Minnesota
Bloemendaal, G. J. ..... Ipswich
Bormes, R. E. ..... Aberdeen
Bormes, W. E. ..... Aberdeen
Bostian, LeRoy ..... Aberdeen
Bunker, P. G. ..... Aberdeen
Bunker, Thomas ..... Aberdeen
Calene, J. L. ..... Aberdeen
Chavier, Juan R. ..... Aberdeen
Currie, K. P. ..... Arizona
Damm, W. P. ..... Redfield
deDianous, N., Jr. ..... Aberdeen
Destache, Donald ..... Aberdeen
Driver, I. ..... Aberdeen
Eckrich, J. A. ..... Aberdeen
Eckrich, J. A., Jr. ..... Aberdeen
Fahrenwald, M. ..... Redfield
Gerber, B. C. ..... Aberdeen
Graff, L. W. ..... Britton
Hagan, A. S. ..... Faulkton
Herrera, Mario ..... Aberdeen
Hovland, James I. ..... Aberdeen
Janusz, A. J. ..... Aberdeen
Keegan, Agnes ..... Aberdeen
King, B. F. ..... Aberdeen
Kosse, Karl ..... Aberdeen
Kryger, Peter ..... Groton
Leon, Paul ..... Aberdeen
MacDonough, H. J. ..... Aberdeen
McCarthy, P. V. ..... Aberdeen
McGee, R. C. ..... Aberdeen
McIntosh, G. F. ..... Eureka
Miller, W. C. ..... Aberdeen
Murdy, B. C. ..... Aberdeen
Murdy, C. B. ..... Aberdeen
Norgello, V. ..... Redfield
Patterson, D. ..... Redfield
Perry, E. J. ..... Redfield
Pfisterer, T. R. ..... Arizona
Rodine, J. C. ..... Aberdeen
Rosa, S. ..... Redfield
Rudolph, E. A. ..... Aberdeen
Sanders, M. E. ..... Redfield
Scheffel, A. ..... Redfield
Seaman, David ..... Aberdeen
Shousha, Albert ..... Britton
Spicer, E. R. P. ..... Aberdeen
Steele, G. H. ..... Aberdeen
Sweeny, W. T. ..... Aberdeen
Taylor, Wm. R. ..... Aberdeen
Vogele, A. C. ..... Aberdeen
Vogele, C. L. ..... Aberdeen
Zvejnieks, K. ..... Aberdeen

WATERTOWN
DISTRICT No. 2

Pres., D. N. Fedt, M.D.
Sec., A. K. Brevik, M.D.

Allen, S. ..... Watertown
Argabrite, J. W. ..... Watertown
Auskaps, R. ..... Watertown
Bartron, G. Robert ..... Watertown
Bartron, H. J., Jr. ..... Watertown
Brakss, V. ..... Watertown
Brevik, A. K. ..... Watertown
Brewster, C. B. ..... Watertown
Brown, H. Russell ..... Watertown
Clark, C. J. ..... Watertown
Fedt, D. ..... Watertown
Gysin, M. W. ..... Watertown
Heinrichs, E. H. ..... Watertown
Hughes, H. D. ..... Clear Lake
Huppler, E. G. ..... Watertown
Magtibay, M. ..... Estelline
Nelson, P. S. ..... Watertown
Reul, T. ..... Watertown
Rousseau, M. C. ..... Watertown
Ryan, C. ..... Watertown
*Scheib, A. P. ..... Watertown
Stoltz, C. R. ..... Watertown
Stransky, J. J. ..... Watertown
Tracy, G. E. ..... Watertown
Willen, A. ..... Clark
Wrage, T. J., Jr. ..... Watertown

MADISON-BROOKINGS
DISTRICT No. 3

Pres., Richard Belatti, M.D.
Sec., C. M. Kershner, M.D.

Anderson, J. A. ..... Madison
Arbon, R. K. ..... Lake Preston
Belatti, R. G. ..... Madison
Benjamin, M. B. ..... Mich.
Davidson, M. ..... Brookings
Friefeld, S. ..... Brookings
Henry, Robert ..... Brookings
Hura, R. ..... Howard
Karlen, L. W. ..... Madison
Kershner, C. M. ..... Brookings
Klar, W. ..... Flandreau
Lushbough, B. C. ..... Brookings
Muggly, J. A. ..... Madison
Otey, B. T. ..... Flandreau
Patt, W. H. ..... Brookings
Peeke, A. P. ..... Volga
Plowman, E. T. ..... Brookings
Reagan, J. L. ..... Madison
Roberts, C. S., Jr. ..... Brookings
Scheller, D. L. ..... Arlington
Shaskey, R. E. ..... Brookings
*Sherwood, C. E. ..... Madison
Stensrud, H. J. ..... Madison
Tank, M. ..... Brookings
Watson, E. S. ..... Brookings
*Westaby, J. R. ..... Madison
Whitson, G. E. ..... Madison
Wold, H. R. ..... Madison

PIERRE
DISTRICT No. 4

Pres., Barbara Spears, M.D.
Sec., J. T. Cowan, M.D.

Askwig, L. C. ..... Pierre
Collins, E. H. ..... Gettysburg
Cowan, J. T. ..... Pierre
Ferguson, James ..... Murdo
Fox, S. W. ..... Pierre
Horthy, A. ..... Kennebec
Horthy, K. ..... Kennebec
Illig, K. M. ..... Pierre
Jahraus, R. C. ..... Pierre
Lindbloom, B. O. ..... Pierre
Morrissey, M. M. ..... Pierre
Simon, S. ..... Pierre
Spears, B. ..... Pierre
Sundet, N. J. ..... Kadoka
Swanson, C. L. ..... Pierre
Tieszen, A. J. ..... Pierre
Urbanyi, E. W. ..... Gettysburg
Van Heuvelen, G. J. ..... Pierre
Werthman, H. E. ..... Pierre
Westland, G. I. ..... Onida
Zakahi, R. J. ..... Pierre

HURON
DISTRICT No. 5

Pres., James DeGeest, M.D.
Sec., William Hanson, M.D.

Adams, H. P. ..... Huron
Avots-Avotins, K. ..... Texas
Bell, G. Robert ..... De Smet
Buchanan, D. ..... Huron
Buchanan, R. A. ..... Huron
Charbonneau, Y. ..... Huron
Dean, Roscoe ..... Wess. Springs
DeGeest, J. H. ..... Miller
Gryte, C. F. ..... Huron
Hagin, J. C. ..... Miller
Hanisch, E. C., Jr. ..... Huron
Hanson, Wm. O. ..... Huron
Hines, Thomas ..... Miller
Hofer, E. A. ..... Huron
Hohm, P. ..... Huron
Hohm, T. ..... Huron
Huet, G. M. ..... Huron
Kilpatrick, W. R. J. ..... Huron
Lardinois, C. C. ..... Huron
Leigh, F. D. ..... Huron
Lenz, B. T. ..... Huron
Mendoza, Carlos ..... Huron
Odland, W. B. ..... Huron
Orgusaar, R. ..... Florida
Saxton, W. H. ..... Huron
Saylor, H. L., Jr. ..... Huron
Tschetter, P. S. ..... Huron

MITCHELL
DISTRICT No. 6

Pres., W. H. Fritz, M.D.
Sec., Jack T. Berry, M.D.

*Auld, C. V. ..... Plankinton
Berry, J. T. ..... Mitchell
Binder, C. F. ..... Chamberlain
Brogdon, P. P. ..... Mitchell
Delaney, Robert ..... Mitchell
Delaney, W. A., Jr. ..... Mitchell
Fritz, W. H. ..... Mitchell
Gere, R. G. ..... Mitchell
Gillis, F. D. ..... Mitchell
Hockett, R. D. ..... Mitchell
Holland, L. W. ..... Chamberlain
Lewis, H. R. ..... Mitchell
Lloyd, J. H. ..... Mitchell
Mabee, D. R. (ret.) ..... Mitchell
Mabee, J. O. ..... Mitchell
Mabee, O. J. ..... Mitchell
McCann, J. P. ..... Parkston
Monson, C. D. ..... Parkston
Mueller, E. H. ..... Tripp
Porter, M. H. ..... Parkston
Skogmo, B. R. ..... Mitchell
Tobin, F. J. ..... Mitchell
Tobin, L. W. ..... Mitchell
Vonburg, V. R. ..... Mitchell
Vose, J. L. ..... Mitchell
Weatherill, D. W. ..... Mitchell
Weber, R. A. ..... Mitchell

SIOUX FALLS
DISTRICT No. 7

Pres., J. B. Gregg, M.D.
Sec., B. J. Begley, M.D.
Treas., D. L. Ensberg, M.D.

Amundson, Loren ... Sioux Falls
Anderson, C. ..... Sioux Falls
Anderson, T. R. ..... Sioux Falls
Anderson, W. R. ..... Sioux Falls
Angelos, T. ..... Canton
Arneson, W. A. ..... Sioux Falls
Aspaas, P. K. ..... Dell Rapids
Barlow, J. F. ..... Sioux Falls
Barnett, G. L. ..... Sioux Falls
Becker, S. ..... Sioux Falls
Begley, B. J. ..... Sioux Falls
Billion, T. J., Jr. ..... Sioux Falls
Breit, D. H. ..... Sioux Falls
Brzica, S. M. ..... Sioux Falls
Bullock, G. D. ..... Sioux Falls
Burns, E. A. ..... Sioux Falls
Burns, K. R. ..... Sioux Falls
*Carney, M. ..... Texas
Chalmers, J. H. ..... Sioux Falls
Church, W. G. ..... Sioux Falls
Cottam, G. I. W. ..... Sioux Falls
Cutshall, V. H. ..... Sioux Falls
Cutshall, V. K. ..... Sioux Falls
Davidson, H. E. ..... Sioux Falls
Daw, E. F. ..... Sioux Falls
de Almeida, M. J. ..... Viborg
de Marco, Lynn ..... Sioux Falls
Devick, J. C. ..... Colton
Donahoe, J. W. ..... Sioux Falls
Donahoe, R. R. ..... Sioux Falls
*Donahoe, W. E. ..... Sioux Falls
Driver, D. R. ..... Sioux Falls
Duimstra, Fred ..... Sioux Falls
Eirinberg, I. ..... Sioux Falls
Elkjer, N. J. ..... Sioux Falls
Ensberg, D. ..... Sioux Falls
Epp, D. ..... Freeman
Ericksen, E. G. ..... Sioux Falls
Faber, Donald ..... Iowa
Fairbanks, W. H. ..... Sioux Falls
Farrell, H. W. ..... Sioux Falls
Ferrell, M. R. ..... Sioux Falls
Fisk, R. G. ..... Dell Rapids
Frost, D. M. ..... Sioux Falls
Gensler, Thomas ..... Canton
Giebink, R. R. ..... Sioux Falls
*Green, R. D. ..... Sioux Falls
Greenfield, D. ..... Sioux Falls
Greenfield, R. E. ..... Sioux Falls
Greenough, E. E. ..... Sioux Falls
Gregg, J. B. ..... Sioux Falls
Gross, H. Phil ..... Sioux Falls
Grove, M. S. ..... Sioux Falls
Hage, W. ..... Sioux Falls
Hansen, H. F. ..... Sioux Falls
Hosen, R. S. ..... Sioux Falls
Hoskins, J. H. ..... Sioux Falls
Ihle, C. W. ..... Sioux Falls
Jameson, G. M. ..... Sioux Falls
Janis, J. B. ..... Sioux Falls
Jones, W. L. ..... Sioux Falls
Kahler, Stephen ..... Sioux Falls
Kaufman, I. I. ..... Freeman
Kaul, Lothar ..... Sioux Falls
*Keller, S. A. ..... California
Kemper, C. E. ..... Viborg
King, L. M. ..... Sioux Falls
Kittelson, H. O. ..... Sioux Falls
Knowles, R. C. ..... Sioux Falls
Kohlmeyer, F. C. ..... Sioux Falls
Larson, C. S. ..... Sioux Falls
Leander, R. B. ..... Sioux Falls
Leraan, L. G. ..... Sioux Falls
Lietzke, E. T. ..... Beresford
Manning, D. H. ..... Sioux Falls
Maresh, E. R. ..... Sioux Falls
Mattice, Lloyd ..... Sioux Falls
Moller, C. ..... Dell Rapids
Mutch, M. J. ..... Sioux Falls
McDonald, C. J. ..... Sioux Falls
McGreevy, E. J. ..... Sioux Falls
McGreevy, J. V. ..... Sioux Falls
McHardy, B. R. ..... Sioux Falls
*Nelson, J. A. ..... California
Nelson, R. E. ..... Sioux Falls
Ogborn, R. J. ..... Sioux Falls
Olson, R. G. ..... Sioux Falls
Opheim, W. L. ..... Sioux Falls
Orr, R. T. ..... Sioux Falls
Ortmeier, Denny ..... Sioux Falls
*Pankow, L. J. ..... Sioux Falls
*Parke, L. L. ..... Canton
Pasek, E. A. ..... Sioux Falls
Peik, D. J. ..... Sioux Falls
Peters, E. H. ..... Sioux Falls
Petres, A. ..... Salem
Quinn, R. H. ..... Sioux Falls
*Quinn, R. J. ..... Sioux Falls
Reagan, P. R. ..... Sioux Falls
Sanderson, E. W. ..... Sioux Falls
Sercl, W. ..... Sioux Falls
Shaeffer, J. H. ..... Sioux Falls
Shreves, H. ..... Sioux Falls
Smith, G. W. ..... Sioux Falls
Stahmann, F. ..... Sioux Falls
Steiner, P. K. ..... Sioux Falls
Stern, C. A. ..... Sioux Falls
Strauss, B. ..... Parker
Tuohy, Gerald F. ..... Sioux Falls
Van Demark, R. E. ... Sioux Falls
Van Lier, P. C. ..... Sioux Falls
Villa, Jose ..... Freeman
*Volin, H. P. ..... Lennox
Volin, V. V. ..... Sioux Falls
Votaw, F. ..... Sioux Falls
Weaver, R. J. ..... Sioux Falls
Wegner, K. H. ..... Sioux Falls
Wessman, N. E. ..... Sioux Falls
Williams, M. F. ..... Minnesota
Wingert, Marvin ..... Garretson
Zandersons, V. ..... Parker
*Zimmerman, Goldie E. Missoula, Montana

YANKTON
DISTRICT No. 8

Pres., D. Max Reade, M.D.
Sec., N. B. Saoi, M.D.
Treas., Dagmar Glood, M.D.

Abts, F. J. ..... Yankton
Andre, H. C. ..... Vermillion
Auld, Marian ..... Yankton
Auld, M. A. ..... Yankton
Behan, Lawrence ..... Yankton
Berg, S. ..... Scotland
Cline, D. W. ..... Yankton
Cohen, M. M. ..... Wagner
Domina, Alan A. ..... Tyndall
Eyres, T. E. ..... Vermillion
Faithe, Margaret ..... Wakonda
Foley, R. J. ..... Tyndall
Glood, D. ..... Viborg
Grover, W. W. ... Bondeul, Wisc.
Haas, F. W. ..... Yankton
Hendeles, Frieda ..... Yankton
Herbrandson, C. R. ... Vermillion
*Hill, J. F. ..... Yankton
Honke, R. W. ..... Wagner
Hubner, R. F. ..... Yankton
Jackson, J. K. ..... Yankton
Johnson, C. F. ..... Yankton
Kalda, E. F. ..... Platte
Kleinsasser, G. ..... Scotland
Knabe, G. W. ..... Vermillion
Lyso, M. ..... Yankton
McVay, C. B. ..... Yankton
Moore, E. J. ..... Vermillion
Nelson, Earl ..... Lake Andes
Nordmo, S. H. ..... Vermillion
Porter, Richard I. ..... M.S.
Price, Ronald ..... Armour
Ranney, B. ..... Yankton
Reade, D. M. ..... Yankton
Reaney, D. B. ..... Yankton
Reding, A. P. ..... Marion
Riesberg, E. ..... Yankton
Saoi, N. B. ..... Yankton
Sattler, T. H. ..... Yankton
Savage, L. ..... Yankton
Sebring, F. U. ..... Vermillion
Stanage, W. F. ..... Yankton
Steele, J. P. ..... Yankton
Thompson, R. F. ..... Yankton
Tidd, J. T. ..... Yankton
Turner, C. R. ..... Vermillion
Willcockson T. H. ..... Yankton

BLACK HILLS
DISTRICT No. 9

Pres., Harold Frost, M.D.
Sec., John Hewitt, M.D.

Allen, Bruce ..... Rapid City
Anderson, A. B. ..... Lead
Angelos, G. ..... Hot Springs
Bailey, J. D. ..... Rapid City
Bareis, R. J. ..... Rapid City
Barrett, A. J. ..... Rapid City
Behrens, C. L. ..... Rapid City
Blunck, C. J. ..... Rapid City
Borgmeyer, H. J. ..... Rapid City
Boyce, R. A. ..... Rapid City
Bray, R. B. ..... Rapid City
Cameron, D. E. ..... Rapid City
Carson, L. E. ..... Lead
*Chassell, J. L. ..... Belle Fourche
Chu, C. L. ..... Alabama
Clark, B. S. ..... Spearfish
Clark, C. A. ..... Lead
Cline, J. A. ..... Rapid City
Cowan, L. K. ..... Rapid City
*Crane, H. L. ..... Avon, Conn.
Davis, J. H. ..... Belle Fourche
Dulaney, C. H. ..... Ft. Meade
Dzintars, P. F. ..... Rapid City
Elston, J. T. ..... Rapid City
Feehan, J. J. ..... Rapid City
Finley, R. C. ..... Rapid City
Freimark, L. G. ..... Rapid City
Fromm, H. E. ..... Rapid City
Frost, H. L. ..... Rapid City
Geib, W. A. ..... Rapid City
Gilbert, F. J. ..... Ft. Meade
Grau, H. J. ..... Rapid City
Gwinn, C. B. ..... Rapid City
Hamm, J. N. ..... Sturgis
Hare, H. J. ..... Rapid City
*Hare, Lyle ..... Spearfish
Harris, R. H. ..... Rapid City
Haugan, H. O. ..... Rapid City
Hewitt, J. M. ..... Rapid City
*Jackson, A. S. ..... Rapid City
Jacobson, T. R. ..... Hot Springs
Jatoi, A. M. ..... Deadwood
Johnson, Robert K. ..... Rapid City
Jones, R. S. ..... Rapid City
Jones, W. E. ..... Sturgis
Kegaries, D. L. ..... Rapid City
Kovarik, R. A. ..... Rapid City
Kovarik, W. J. ..... Rapid City
Kwan, F. P. ..... Rapid City
Lampert, A. A. ..... Rapid City
Leeds, J. F. ..... Rapid City
Lydiatt, J. ..... Hot Springs
Mangulis, G. ..... Philip
Marousek, M. ..... Belle Fourche
Mattox, J. E. ..... Deadwood
Mead, T. ..... Spearfish
Merryman, M. P. ..... Rapid City
Millea, R. P. ..... Rapid City
*Mills, G. W. ..... Wall
*O'Toole, T. F. ..... Rapid City
Owen, G. S. ..... Rapid City
Palmerton, E. S. ..... Rapid City
Paulson, G. ..... Rapid City
Pokorny, J. F. ..... Newell
*Radusch, F. J. ..... Rapid City
Redding, T. J. ..... Belle Fourche
Roman, T. P. ..... Martin
Roper, C. E. ..... Hot Springs
Salladay, I. R. ..... Ft. Meade
Saxton, A. J. ..... Kansas
Semones, A., Jr. ..... Lead
Sherrill, S. F. ..... Belle Fourche
Slingsby, J. B. ..... Rapid City
Smiley, J. C. ..... Deadwood
Smith, J. J. ..... Lead
Spain, M. L. ..... Rapid City
Stewart, J. W. ..... Lead
Swisher, L. P. ..... Kadoka
Tesar, C. E. ..... Rapid City
Theissen, H. H. ..... Rapid City
Walton, J. ..... Martin
Westaby, R. S., Jr. ..... Rapid City
Whitney, N. R. ..... Rapid City
Williams, F. R. ..... Rapid City
Wood, G. F. ..... Rapid City
Yackley, J. V. ..... Rapid City
Zanka, J. A. ..... Rapid City

ROSEBUD
DISTRICT No. 10

Pres., M. R. Cosand, M.D.

Cosand, M. R. ..... Winner
Hayes, R. H. ..... M.S.
Lakstigala, Peter ..... White River
Monfore, James ..... Winner
Nemer, R. G. ..... Gregory
Stiehl, R. ..... Winner
Studenberg, D. ..... Gregory
Studenberg, J. E. ..... Winner
Sweet, E. P. ..... Burke
Vogelgesang, L. C. ..... Gregory

NORTHWEST
DISTRICT No. 11

Sec., B. P. Nolan, M.D.

Gunc, Bedrettin ..... Herreid
Johnson, C. A. ..... Lemmon
Linde, Leonard ..... Mobridge
Lowe, Harold ..... Mobridge
Nolan, B. P. ..... Mobridge
Ryan, J. E. ..... Mobridge
Sabbagh, M. ..... McLaughlin
Spiry, A. W. ..... Mobridge
Torkildson, G. ..... McLaughlin
Totten, F. C. ..... Lemmon

WHETSTONE VALLEY
DISTRICT No. 12

Pres., Joseph Kass, M.D.
Sec., Ruth Czajkowskyj, M.D.

Batt, E. J. ..... Sisseton
Brauer, H. H. ..... Sisseton
Brinkman, W. C. ..... Sisseton
Czajkowskyj, R. ..... Veblen
Czajkowskyj, T. ..... Veblen
Gregory, D. A. ..... Milbank
Janavs, V. ..... Milbank
Johnson, E. A. ..... Milbank
Judge, W. T. ..... Milbank
Kass, Joseph ..... Rosholt
Karlins, W. H. ..... Webster
Keller, L. W. ..... Webster
Lie, Dagfinn ..... Webster
Lovering, J. ..... Sisseton

M.S.—Indicates Military Service

*—Indicates Honorary Membership

South Dakota State Medical Association Roster — 1966

Membership — Alphabetical Listing

Abts, F. J. ..... Yankton
Adams, H. P. ..... Huron
Allen, Bruce ..... Rapid City
Allen, S. W. ..... Watertown
*Alway, J. D. ..... Arizona
Amundson, Loren ..... Sioux Falls
Anderson, A. B. ..... Lead
Anderson, C. Wm. ..... Sioux Falls
Anderson, J. A. ..... Madison
Anderson, T. R. ..... Sioux Falls
Anderson, W. R. ..... Sioux Falls
Andre, H. C. ..... Vermillion
Angelos, G. ..... Hot Springs
Angelos, T. ..... Canton
Arbon, R. K. ..... Lake Preston
Argabrite, J. W. ..... Watertown
Arneson, W. A. ..... Sioux Falls
Askwig, L. C. ..... Pierre
Aspaas, P. K. ..... Dell Rapids
*Auld, C. V. ..... Plankinton
Auld, Marian ..... Yankton
Auld, M. A. ..... Yankton
Auskaps, R. ..... Watertown
Avots-Avotins, K. ..... Texas
Avotins, R. ..... Faulkton
Bailey, J. D. ..... Rapid City
Bareis, R. J. ..... Rapid City
Barlow, J. F. ..... Sioux Falls
Barnett, G. L. ..... Sioux Falls
Barrett, A. J. ..... Rapid City
Bartron, G. R. ..... Watertown
Bartron, H. J., Jr. ..... Watertown
Batt, E. J. ..... Sisseton
Becker, S. F. ..... Sioux Falls
Begley, B. J. ..... Sioux Falls
Behan, L. G. ..... Yankton
Behrens, C. L. ..... Rapid City
Belatti, R. G. ..... Madison
Bell, G. Robert ..... De Smet
Benjamin, M. B. ..... Michigan
Berg, S. ..... Scotland
Berry, J. T. ..... Mitchell
Berzins, R. ..... Minnesota
Billion, T. J., Jr. ..... Sioux Falls
Binder, C. F. ..... Chamberlain
Bloemendaal, G. J. ..... Ipswich
Blunck, C. F. ..... Rapid City
Borgmeyer, H. J. ..... Rapid City
Bormes, R. E. ..... Aberdeen
Bormes, W. E. ..... Aberdeen
Bostian, Leroy ..... Aberdeen
Boyce, R. A. ..... Rapid City
Brakss, V. ..... Watertown
Brauer, H. H. ..... Sisseton
Bray, R. B. ..... Rapid City
Breit, D. H. ..... Sioux Falls
Brevik, A. K. ..... Watertown
Brewster, C. B. ..... Watertown
Brinkman, W. C. ..... Sisseton
Brogdon, P. P. ..... Mitchell
Brown, H. R. ..... Watertown
Brzica, S. M. ..... Sioux Falls
Buchanan, D. ..... Huron
Buchanan, R. A. ..... Huron
Bullock, G. D. ..... Sioux Falls
Bunker, P. G. ..... Aberdeen
Bunker, Thomas ..... Aberdeen
Burns, E. A. ..... Sioux Falls
Burns, K. R. ..... Sioux Falls
Calene, J. L. ..... Aberdeen
Cameron, D. E. ..... Rapid City
*Carney, M. ..... Ft. Worth, Texas
Carson, L. E. ..... Lead
Chalmers, J. H. ..... Sioux Falls
Charbonneau, Y. H. ..... Huron
*Chassell, J. L. ..... Belle Fourche
Chavier, J. R. ..... Aberdeen
Chu, C. L. ..... Alabama
Church, Bill G. ..... Sioux Falls
Clark, B. S. ..... Spearfish
Clark, C. A. ..... Lead
Clark, C. J. ..... Watertown
Cline, J. A. ..... Rapid City
Cohen, M. M. ..... Wagner
Collins, E. H. ..... Gettysburg
Cosand, M. R. ..... Winner
Cottam, G. I. W. ..... Sioux Falls
Cowan, J. T. ..... Pierre
Cowan, L. K. ..... Rapid City
*Crane, H. L. ..... Connecticut
Currie, K. P. ..... Arizona
Cutshall, V. H. ..... Sioux Falls
Cutshall, V. K. ..... Sioux Falls
Czajkowskyj, Ruth ..... Veblen
Czajkowskyj, T. ..... Veblen
Damm, W. P. ..... Redfield
Davidson, H. E. ..... Sioux Falls
Davidson, M. ..... Brookings
Davis, J. H. ..... Belle Fourche
Daw, E. F. ..... Sioux Falls
Dean, Roscoe ..... Wess. Springs
de Almeida, M. J. ..... Viborg
deDianous, N., Jr. ..... Aberdeen
De Geest, J. H. ..... Miller
Delaney, R. J. ..... Mitchell
Delaney, W. A., Jr. ..... Mitchell
de Marco, Lynn ..... Sioux Falls
Destache, Donald ..... Aberdeen
Devick, J. S. ..... Colton
Domina, Alan ..... Tyndall
Donahoe, J. W. ..... Sioux Falls
Donahoe, R. R. ..... Sioux Falls
*Donahoe, W. E. ..... Sioux Falls
Driver, D. R. ..... Sioux Falls
Driver, I. E. ..... Aberdeen
Duimstra, Fred ..... Sioux Falls
Dulaney, C. H. ..... Ft. Meade
Dzintars, P. F. ..... Rapid City
Eckrich, J. A. ..... Aberdeen
Eckrich, J. A., Jr. ..... Aberdeen
Eirinberg, I. ..... Sioux Falls
Elkjer, W. J. ..... Sioux Falls
Elston, J. T. ..... Rapid City
Ensberg, D. L. ..... Sioux Falls
Epp, D. L. ..... Freeman
Ericksen, E. G. ..... Sioux Falls
Eyres, T. E. ..... Vermillion
Faber, Donald ..... Iowa
Fahrenwald, M. ..... Redfield
Fairbanks, W. H. ..... Sioux Falls
Faithe, Margaret ..... Wakonda
Farrell, H. W. ..... Sioux Falls
Fedt, Donald ..... Watertown
Feehan, J. J. ..... Rapid City
Ferguson, J. S. ..... Murdo
Ferrell, M. R. ..... Sioux Falls
Finley, R. C. ..... Rapid City
Fisk, R. G. ..... Dell Rapids
Foley, R. J. ..... Tyndall
Fox, S. W. ..... Pierre
Freimark, L. ..... Rapid City
Friefeld, S. ..... Brookings
Fritz, W. H. ..... Mitchell
Fromm, H. E. ..... Rapid City
Frost, D. M. ..... Sioux Falls
Frost, H. L. ..... Rapid City
Geib, W. A. ..... Rapid City
Gensler, Thomas ..... Canton
Gerber, B. C. ..... Aberdeen
Gere, R. G. ..... Mitchell
Giebink, R. R. ..... Sioux Falls
Gilbert, F. J. ..... Ft. Meade
Gillis, F. D. ..... Mitchell
Glood, D. ..... Viborg
Graff, L. W. ..... Britton
Grau, H. J. ..... Rapid City
*Green, R. D. ..... Sioux Falls
Greenfield, D. L. ..... Sioux Falls
Greenfield, R. E. ..... Sioux Falls
Greenough, E. E. ..... Sioux Falls
Gregg, J. B. ..... Sioux Falls
Gregory, D. A. ..... Milbank
Gross, H. Phil ..... Sioux Falls
Grove, M. S. ..... Sioux Falls
Grover, W. W. ..... Bondeul, Wisc.
Gryte, C. F. ..... Huron
Gunc, Bedrettin ..... Herreid
Gwinn, C. B. ..... Rapid City
Gysin, Walter ..... Watertown
Haas, F. W. ..... Yankton
Hagan, A. S. ..... Faulkton
Hage, W. J. ..... Sioux Falls
Hagin, J. C. ..... Miller
Hamm, J. N. ..... Sturgis
Hanisch, E. C., Jr. ..... Huron
Hansen, H. F. ..... Sioux Falls
Hanson, W. O. ..... Huron
Hare, H. J. ..... Rapid City
*Hare, Lyle ..... Spearfish
Harris, Russell ..... Rapid City
Haugan, H. O. ..... Rapid City
Hayes, R. H. ..... M.S.
Heinrichs, E. H. ..... Watertown
Hendeles, Frieda ..... Yankton
Henry, Robert ..... Brookings
Herbrandson, C. R. ..... Vermillion
Herrera, M. L. ..... Aberdeen
Hewitt, J. M. ..... Rapid City
*Hill, J. F. ..... Yankton
Hines, Thomas ..... Miller
Hockett, R. D. ..... Mitchell
Hofer, E. A. ..... Huron
Hohm, Paul ..... Huron
Hohm, Theo. ..... Huron
Holland, L. W. ..... Chamberlain
Honke, R. W. ..... Wagner
Horthy, A. ..... Kennebec
Horthy, K. ..... Kennebec
Hosen, R. S. ..... Sioux Falls
Hoskins, J. H. ..... Sioux Falls
Hovland, James I. ..... Aberdeen
Hubner, R. F. ..... Yankton
Huet, G. M. ..... Huron
Hughes, H. D. ..... Clear Lake
Huppler, E. G. ..... Watertown
Hura, R. ..... Howard
Ihle, C. W. ..... Sioux Falls
Illig, K. M. ..... Pierre
*Jackson, A. S. ..... Rapid City
Jackson, J. K. ..... Yankton
Jacobson, T. R. ..... Hot Springs
Jameson, G. M. ..... Sioux Falls
Jahraus, R. C. ..... Pierre
Janavs, V. ..... Milbank
Janis, J. B. ..... Sioux Falls
Janusz, A. J. ..... Aberdeen
Jatoi, A. M. ..... Deadwood
Johnson, C. A. ..... Lemmon
Johnson, C. F. ..... Yankton
Johnson, E. A. ..... Milbank
Johnson, Robert ..... Rapid City
Jones, R. S. ..... Rapid City
Jones, W. E. ..... Sturgis
Jones, W. L. ..... Sioux Falls
Judge, W. T. ..... Milbank
Kahler, Stephen ..... Sioux Falls
Kalda, E. F. ..... Platte
Karlen, L. W. ..... Madison
Karlins, W. H. ..... Webster
Kass, Joseph ..... Rosholt
Kaufman, I. I. ..... Freeman
Kaul, Lothar ..... Sioux Falls
Keegan, Agnes ..... Aberdeen
Kegaries, D. L. ..... Rapid City
Keller, L. W. ..... Webster
*Keller, S. A. ..... California
Kemper, C. E. ..... Viborg
Kershner, C. M. ..... Brookings
Kilpatrick, W. R. J. ..... Huron

King, B. F. ..... Aberdeen
King, L., Jr. ..... Sioux Falls
Kittelson, H. O. ..... Sioux Falls
Klar, W. ..... Flandreau
Kleinsasser, G. ..... Scotland
Knabe, G. W. ..... Vermillion
Knowles, R. C. ..... Sioux Falls
Kohlmeyer, F. C. ..... Sioux Falls
Kosse, Karl ..... Aberdeen
Kovarik, R. A. ..... Rapid City
Kovarik, W. J. ..... Rapid City
Kryger, P. ..... Groton
Kwan, F. P. ..... Rapid City
Lakstigala, Peter ..... White River
Lampert, A. A. ..... Rapid City
Lardinois, C. C. ..... Huron
Larson, C. S. ..... Sioux Falls
Leander, R. B. ..... Sioux Falls
Leeds, J. F. ..... Rapid City
Leigh, F. D. ..... Huron
Lenz, B. T. ..... Huron
Leon, Paul ..... Aberdeen
Leraan, L. G. ..... Sioux Falls
Lewis, H. R. ..... Mitchell
Lie, Dagfinn ..... Webster
Lietzke, E. T. ..... Beresford
Lindbloom, B. O. ..... Pierre
Linde, Leonard ..... Mobridge
Lloyd, J. H. ..... Mitchell
Lovering, J. ..... Webster
Lowe, Harold ..... Mobridge
Lushbough, B. C. ..... Brookings
Lydiatt, J. ..... Hot Springs
Lyso, M. ..... Yankton
Mabee, D. R. (ret.) ..... Mitchell
Mabee, J. O. ..... Mitchell
Mabee, O. J. ..... Mitchell
MacDonough, H. J. ..... Aberdeen
Magtibay, M. ..... Estelline
Mangulis, G. ..... Philip
Manning, D. H. ..... Sioux Falls
Maresh, E. R. ..... Sioux Falls
Marousek, M. ..... Belle Fourche
Mattice, Lloyd ..... Sioux Falls
Mattox, J. E. ..... Deadwood
McCann, J. P. ..... Parkston
McCarthy, P. V. ..... Aberdeen
McDonald, C. J. ..... Sioux Falls
McGee, R. C. ..... Aberdeen
McGreevy, E. J. ..... Sioux Falls
McGreevy, J. V. ..... Sioux Falls
McHardy, B. R. ..... Sioux Falls
McIntosh, G. F. ..... Eureka
McVay, C. B. ..... Yankton
Mead, T. ..... Spearfish
Mendoza, Carlos ..... Huron
Merryman, M. P. ..... Rapid City
Millea, R. P. ..... Rapid City
Miller, Walter C. ..... Aberdeen
*Mills, G. W. ..... Wall
Moller, C. ..... Dell Rapids
Monfore, James ..... Winner
Monson, C. D. ..... Parkston
Moore, E. J. ..... Vermillion
Morrissey, M. M. ..... Pierre
Mueller, E. H. ..... Tripp
Muggly, J. A. ..... Madison
Murdy, B. C. ..... Aberdeen
Murdy, C. B. ..... Aberdeen
Mutch, M. G. ..... Sioux Falls
Nelson, Earl ..... Lake Andes
*Nelson, J. A. ..... California
Nelson, P. S. ..... Watertown
Nelson, R. E. ..... Sioux Falls
Nemer, R. G. ..... Gregory
Nolan, B. P. ..... Mobridge
Nordmo, S. H. ..... Vermillion
Norgello, V. ..... Redfield
Odland, W. B. ..... Huron
Ogborn, R. J. ..... Sioux Falls
Olson, R. G. ..... Sioux Falls
Opheim, W. L. ..... Sioux Falls
Orgusaar, R. ..... Florida
Orr, R. T. ..... Sioux Falls
Ortmeier, D. ..... Sioux Falls
Otey, B. T. ..... Flandreau
*O'Toole, T. F. ..... Rapid City
Owen, G. S. ..... Rapid City
Palmerton, E. S. ..... Rapid City
*Pankow, L. J. ..... Sioux Falls
*Parke, L. L. ..... Canton
Pasek, E. A. ..... Sioux Falls
Patt, W. H. ..... Brookings
Patterson, D. ..... Redfield
Paulson, G. S. ..... Rapid City
Peeke, A. P. ..... Volga
Peik, D. J. ..... Sioux Falls
Perry, E. J. ..... Redfield
Peters, E. H. ..... Sioux Falls
Petres, A. ..... Salem
Pfisterer, T. R. ..... Arizona
Plowman, E. T. ..... Brookings
Pokorny, J. F. ..... Newell
Porter, M. H. ..... Parkston
Porter, Richard ..... M.S.
Price, Ronald ..... Armour
Quinn, R. H. ..... Sioux Falls
*Quinn, R. J. ..... Sioux Falls
*Radusch, F. J. ..... Rapid City
Ranney, Brooks ..... Yankton
Reade, D. M. ..... Yankton
Reagan, J. L. ..... Madison
Reagan, P. R. ..... Sioux Falls
Reaney, D. B. ..... Yankton
Redding, T. J. ..... Belle Fourche
Reding, A. P. ..... Marion
Reul, T. W. ..... Watertown
Riesberg, E. ..... Yankton
Roberts, C. S., Jr. ..... Brookings
Rodine, J. C. ..... Aberdeen
Roman, T. P. ..... Martin
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Salladay, I. R. ..... Ft. Meade
Sanders, M. E. ..... Redfield
Sanderson, E. W. ..... Sioux Falls
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Sattler, T. H. ..... Yankton
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BACTERIOLOGICAL TECHNIQUE FOR THE SMALL LABORATORY

Is the title of a short course to be presented by the Department of Pathology of the School of Medicine at the University of South Dakota in Vermillion on August 26 and 27, 1966. Co-sponsored by the South Dakota State Medical Association, the course is designed for the laboratory technician in the doctor's office or small hospital laboratory. It will consist of a review of basic bacteriological principles and procedures readily applicable to office or small hospital laboratory practice. Included will be information about selection and procurement of necessary equipment and supplies. The program will be presented by Karen C. Ashworth, B.S., M.T. (ASCP), medical technologist and George W. Knabe, Jr., M.D., professor of pathology of the School of Medicine. Registration fee is $10.00.

FRIDAY, AUGUST 26

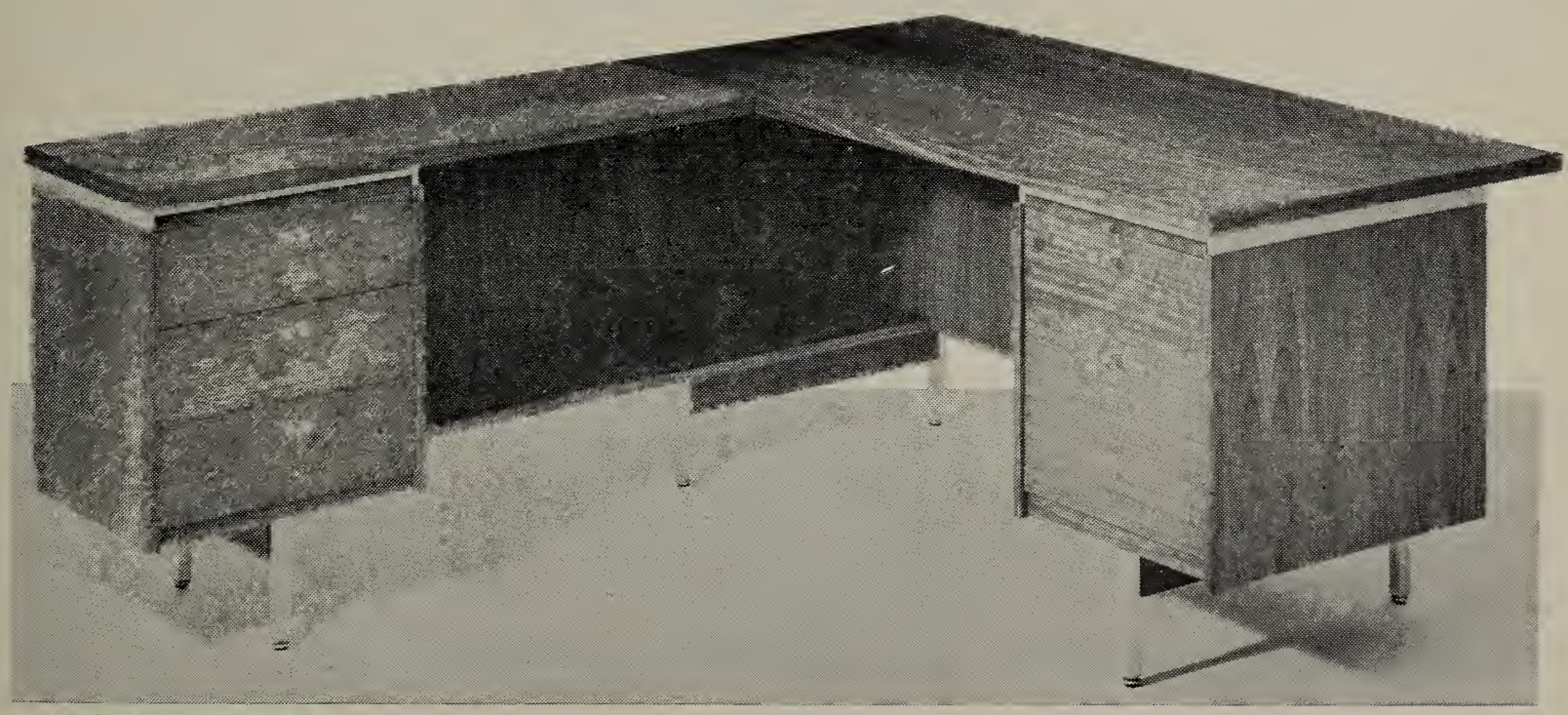
8:00-8:30	Registration Medical Science Building, Vermillion
8:30	Introduction
8:45	Safety Procedures
9:00	Preparation of Media
10:00	Intermission
10:15	Description of Smear Preparation and plating Methods
10:45	Staining Methods
11:15	Bacteriological Tests
12:00	Luncheon
1:00	Bacteriological Tests (continued)
2:00	Collection of Specimens
2:45	Intermission
3:00	Description and Identification of Bacteria
4:00	Sensitivity Testing
4:15	Plating of Unknown Organisms

SATURDAY, AUGUST 27

8:30	Identification Procedures: Throat Culture, Urine Culture and Colony Count, Stool Culture, Wound Culture
11:00	Methods for referral of Specimens
11:30	Conclusion

THE TEMPLATE GROUP by Leopold

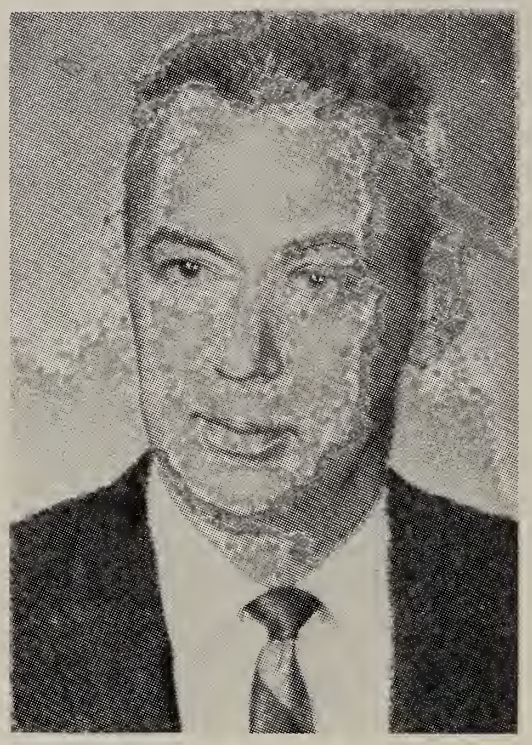
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PRESIDENT'S PAGE



Developments in MEDICARE have put us in a position which finds analogy in the antics of Snoopy in the comic strip "Peanuts." In the last few weeks I have felt that the "Red Baron" (Federal and State Agencies) has had the upper hand and that I have been "shot down in flames" with uncomfortable frequency. The President of the United States has squarely laid the blame for any failure of MEDICARE to the lack of cooperation of not only the physician, but also patient and hospitals. As always, the fact of poor legislation and inconsistencies in administrative regulations is ignored. We have found that regulations may be changed by HEW with alarming suddenness. Certain states are passing legislation which makes previous games of "Federal Pie Cutting" just a "Penny Ante".

The Pathologists have been indicted by the Federal Attorney General's office for restraint of trade and there certainly are some who believe that the AMA and other Medical specialty groups may follow. State and District Societies have been called weak and ineffectual by the Press and the AMA painted as a self perpetuating, greedy giant — only interested in the "Almighty Dollar."

We must take off our masks of complacency and become involved in this situation to prevent the complete breakup of our medical organizations. If this should happen, we would have no voice at all.

Preston Brogdon, M.D.
President

This is your
MEDICAL ASSOCIATION

News Notes • Changes • Births • News

Pop's Proverbs

I believe that the "Many Mansions" Jesus spoke of are human souls, so prepared by sacrifice and devotion to duty that they become Mansions, fit to accommodate both the individual's spirit and the spirit of God, through Eternity.

TWO S. D. HOSPITALS CLOSE DOORS

Two small town hospitals have been forced to close their doors due to the fact that the physicians have left for other areas. The Bowdle Hospital was notified by Dr. Berzins that he is leaving for Minneapolis, Minnesota. At the same time, the Edgemont Memorial Hospital was notified by Dr. Robert J. Lynn that he will be joining a clinic in Hampton, Iowa.

Continuing efforts are being made by both communities to interest physicians in opening practice there. Both hospitals are new, having been built within the past five years.

NEWS NOTES

Dr. and **Mrs. Walter T. Judge** of Milbank recently celebrated their 40th wedding anniversary. Joining them were their four sons, three of whom are doctors, and their daughter. Also present were their ten grandchildren.

Announcement has been made of plans to establish a medical clinic in Lead, South Dakota. The clinic will be staffed by **Dr. Anne Kryger** and her husband, **Dr. Peter Kryger.** Dr. Anne Kryger is presently in Lead; however, Dr. Peter Kryger will remain in Groton, South Dakota, until this fall.

* * *

Harold E. Fromm, M.D., Rapid City, was the recipient of a very special Father's Day Gift. On Saturday, June 18th, his wife presented him with a 6 pound, 13 ounce son. Dr. and Mrs. Fromm have two other children, Debbie, 7, and Stewart, 2.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

Eugene Urbanyi, M.D., Gettysburg, South Dakota, was awarded a second place ribbon for his oil painting during the American Medical Association's convention recently held in Chicago. Awards are given each year for outstanding painting and art created by physicians throughout the United States.

* * *

Charles R. Turner, M.D., formerly of Brookings, South Dakota, has entered a partnership with **Dr. E. J. Moore** in Vermillion, South Dakota.

* * *

South Dakota physicians attending the AMA Annual Meeting in Chicago included **A. P. Reding, Robert Quinn, Preston Brogdon, John Stransky, C. Rodney Stoltz, Arthur Lampert, J. Patrick Steele, Howard Shreves, Geo. McIntosh, George Knabe,** and **Robert Buchanan.**

* * *

H. Russell Brown, M.D., Watertown, South Dakota, President of South Dakota Blue Shield, has recently been appointed to the Professional Relations Committee of the National Association of Blue Shield Plans for the year 1966-67. Dr. Brown, along with five other representatives throughout the United States will coordinate professional relations activities for the National Association of Blue Shield Plans for the coming year.

1966 INTERNSHIP PROGRAM BEGINS

Two Sioux Falls hospitals have again attracted a new class of interns to man their internship programs for the ensuing year, beginning July 1, 1966. Since a number of South Dakota physicians, and communities, are interested in attracting new physicians, this roster will serve as a means of introducing these new interns.

At McKennan Hospital: Dr. Cedric Fortune from the University of Kansas School of Medicine, Dr. Robert Kreiser* from the University of Minnesota Medical School, Dr. William Tarnasky from the University of Kansas School of Medicine, and Dr. Donald Wiltse from the University of Iowa College of Medicine.

At Sioux Valley Hospital: Dr. James Daggett, Dr. Darryl Dochterman*, and Dr. Richard Friess* from the University of Iowa College of Medicine, Dr. Fred Martin* from the University of Nebraska College of Medicine, Dr. James Collins* from the Medical College of Virginia, and Dr. Paul Larson* from the University of Colorado School of Medicine.

It is of further interest that six of these ten interns (those asteriated) are transfer students from the University of South Dakota School of Medicine, and that all ten interns are products of the great Midwest.

* * *

John H. Hoskins, M.D., has joined his father, **James H. Hoskins, M.D.,** in the practice of medicine in Sioux Falls. They specialize in urology.

* * *

B. J. Williams, M.D. is now associated with **M. G. Mutch, Jr., M.D.,** in the practice of obstetrics and gynecology in Sioux Falls.

* * *

Five persons were appointed by Governor Nils Boe to the new state commission on mental health and mental retardation. Named were: Mr. Lauritz Larson, Sioux Falls; Rev. Robert E. Crossmann, Pierre; **Dr. Robert Johnson,** Rapid City, designated by the South Dakota State Medical Association; Howard J. Chinn, Redfield, superintendent of the Redfield State Hospital and School; and **Dr. Lawrence Behan,** superintendent of Yankton State Hospital.

* * *

The Italian National Social Security Institute in Rome, Italy, is offering to foreign medical postgraduates specializing in tuberculosis some scholarships in order to become acquainted with the organization and therapeutic methods for the treatment of tuberculosis practiced by said Institution.

Each scholarship can be allowed in the range from one to eight months of stay in Italy, according to the requests and interests of the applicant and consists only of free room and board at the Institute "Carlo Forlanini" in Rome or at the Institute "Principe di Piemonte" in Naples. No financial allowances or reimbursement of the round trip voyage are granted.

The interested parties who are residents of the State of South Dakota can send their applications with their credentials enclosed and biography to the Italian Consulate General in Chicago (209 North Michigan Avenue, Chicago, Illinois 60601) not later than August 25, 1966.

* * *

Announcement has been made of a name change for the Southwest Blood Banks, Inc. The name has officially been changed to Blood Services of South Dakota. Blood Services of South Dakota provides for the blood needs of nine communities in the Rapid City area, through twelve medical institutions.

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JOURNAL OF MEDICINE

V. 19
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SEPTEMBER • 1966

SOUTH DAKOTA STATE MEDICAL ASSOCIATION
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THE SOUTH DAKOTA

JOURNAL OF MEDICINE

**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **September, 1966** **Number 9**

CONTENTS

Foreword to the Symposium: Cellular Response in Health and Disease . 21
Warren L. Jones, M.D.

Chromosome Analysis and Medical Diagnosis 22
Walter H. Hard, Ph.D.

Genetic Counseling 27
Arthur Robinson, M.D.

Interferon Production by Virus-Infected Cells 30
Charles R. Gausch, Ph.D.

The Possible Role of Bacterial L-Forms in Disease 40
Paul F. Smith

Cytological Basis of Carcinogenesis 46
Edwin B. Shaw, Jr., Ph.D.

Phenylketonuria in Relation to Mental Disease 49
Finley D. Marshall, Jr., Ph.D.

Cellular Action of Cardiac Clycosides 52
J. D. Welty, Ph.D.

Some Disorders of Amino Acid Metabolism in Man 56
L. C. Smith, Ph.D.

Copper Metabolism in Wilson's Disease 59
Jerry B. Critz, Ph.D.

Neurophysiological Basis of Behavior and Motivation 66
W. O. Read, Ph.D.

President's Page 77

This Is Your Medical Association 79

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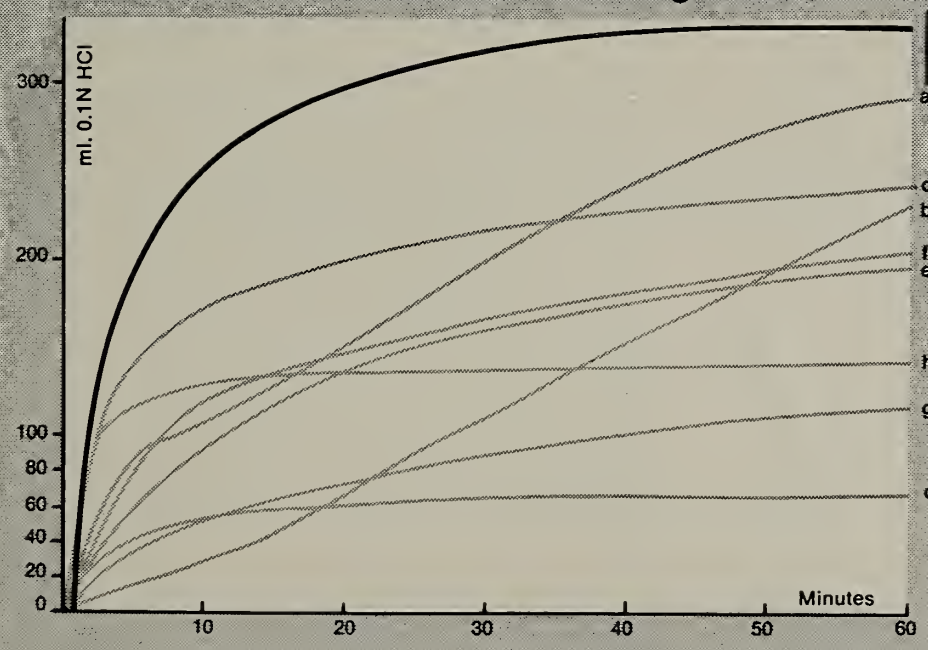
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Foreword to the Symposium: Cellular Response in Health And Disease

Post-graduate medical courses are being made available by the medical schools throughout this country in an attempt to provide continuing education for the practicing physicians. Most programs are presented at the clinical level; however, it is apparent that much of the new information in need of dissemination to the physician is basic science data. It therefore follows that a "basic science" medical school such as ours at the University of South Dakota should play an important role in continuing medical education.

With these thoughts in mind, a symposium of papers was presented in November 1965 at the University of South Dakota School of Medicine entitled "Cellular Response in Health and Disease." The papers that follow comprise most of the content of that symposium, authored by members of the Medical School Faculty, and a guest speaker and discussant, Dr. Arthur Robinson, University of Colorado School of Medicine. The editors of the South Dakota Medical Journal were kind enough to print these papers in a single issue of the Journal so as to provide the proper sequence of the scientific papers and the continuity of thought.

Admittedly, this symposium centered about the cell is far from being complete, but the theme, nevertheless, tends to direct the reader's pattern of thought toward that of cellular mechanisms and structure. The reader will find reference to a number of recent developments and their clinical application, a working knowledge of which is necessary in order to understand the systemic or clinical manifestations of disease processes. Today, the physician must think in terms of cellular structure, regulation of cellular behavior, biochemical and genetic makeup, cellular response to drugs, and other fundamental aspects of cellular responses. Herein lie the answers to some of our most vexing and intriguing problems in clinical medicine.

Warren L. Jones, M.D.

Ass't Dean of Clinical Affairs

Chromosome Analysis and Medical Diagnosis*

Walter L. Hard, Ph.D.
Dean and Professor of Anatomy
University of South Dakota School of Medicine
Vermillion, South Dakota

Recent years have witnessed the development of a variety of techniques to culture cells of various tissue components of the body and for treating these in such a manner as to make it possible to study in considerable detail the chromosomal complements of these cells. This rapidly expanding field of study termed **cytogenetics** opens an entirely new vista to the research worker in the study of disease, but also offers many practical applications to the clinician for medical diagnosis. In many instances, the type of diagnosis which is available from chromosome analysis can serve the physician with scientific information of value in family counseling.

The modern era of cytogenetics started in 1956 with the observation by Tjio and Levan[1] that forty-six chomosomes were represented in cells collected from tissue cultures prepared from lung explants of aborted fetuses. Now prior to this time, and indeed dating from 1921, the normal diploid number of chromosomes for the human had been considered to be forty-eight, based on the study of male germ cells from histological preparations of the testes. Soon after the report by Tjio and Levan, a number of other workers confirmed the observation on a variety of tissue cells that the normal diploid number in the human was indeed forty-six. About this same time, several important technical contributions were made to the study of tissue cells which since have developed rather routine techniques for their culture and the preparation of chomosomes for study. The use of colchicine made it possible to stop the dividing cell in the metaphase stage and fortunately at a time when the chromosomes are condensed to their maximum degree and, therefore, more amenable to staining and study. Subsequently, it was discovered that an extract of the kidney bean, phytohemagglutinin, would stimulate lymphocytes in culture media to divide. With subsequent colchicine treatment the chromosomes of the blood cells could be clearly distinguished and available for study for routine clinical work. The essentials of the technique then are to withdraw a small quantity of blood, allow the plasma to separate, and add this plasma to culture media treating the cells with phytohemagglutinin, allowing an interval of time for cell division to occur, then treating the preparation with colchicine and preparing the slides of such cultured cells for staining and microscopical observation.

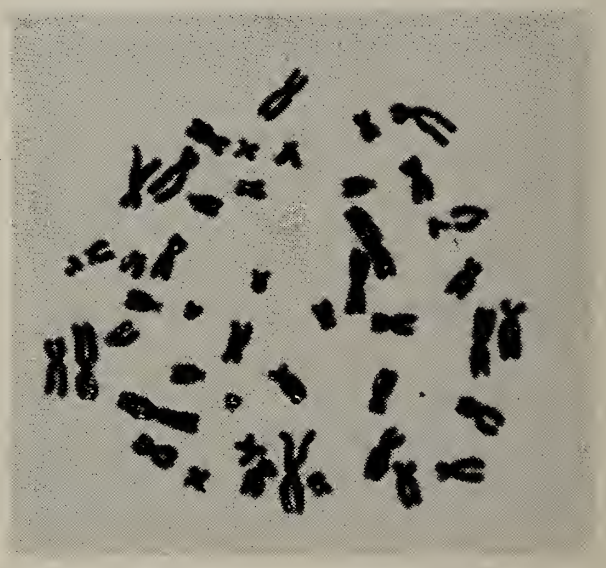


Figure 1. A metaphase plate showing the chromosomes of a single dividing cell as they appear on microscopic observation. This is the same plate as used in the karyotype for Figure 6.

Figure 1 illustrates the appearance of the chromosomes of a single dividing lymphocyte as one observes them under the microscope.

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* Paper presented to medical students and physicians at a post-graduate seminar, Cellular Response in Health & Disease, at the University of South Dakota School of Medicine, November 12 and 13, 1965.

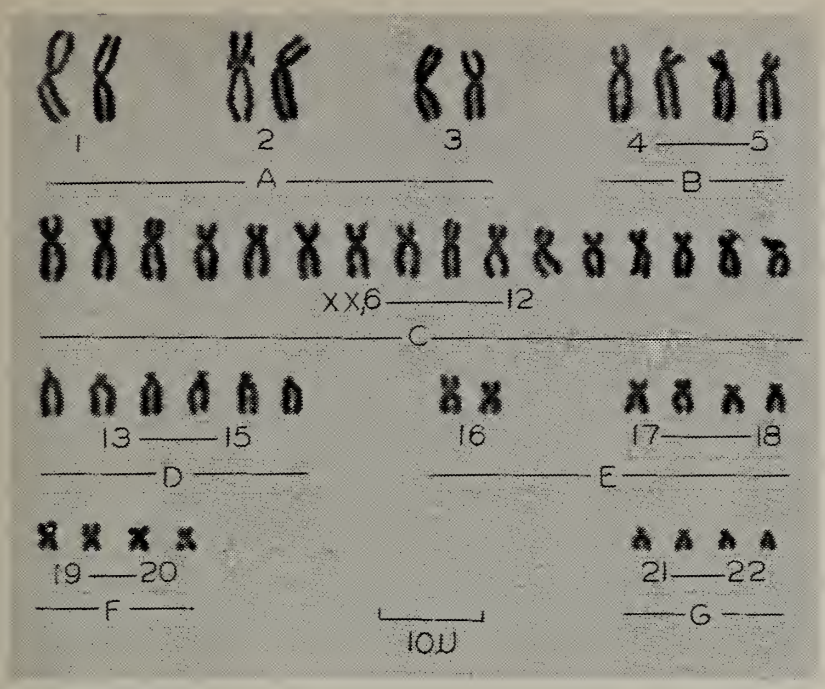


Figure 2. The karyotype of the human female. U.S.D. case #123.

Now in order to detect any abnormalities in these chromosomes it becomes necessary to arrange them in some orderly manner for study. This is done by photographing the mitotic plate, enlarging it by photocopy, then cutting out the chromosomes and arranging them in an orderly manner taking advantage of primarily two criteria, namely the position of the centromere and chromosome size. A specific system of classifying chromosomes was devised in 1960 and is known as the Denver System. Chromosomes so arranged for a given cell are referred to as a karyotype and actually represent the so-called genotype or the sum of the genetic material represented in the given cell. Normally, a given karyotype, that is to say a specific number of chromosomes of given types and characteristics, is specific for each species of animal.



Figure 3. Karyotype of a normal human male. U.S.D. case #100.

When such a karyotype is analyzed for the human, it is readily identifiable to have forty-six, of which forty-four are identified as **autosomes** and two as **sex chromosomes** which in the female are designated as XX (Figure 2) and in the male as XY (Figure 3).

While special techniques involving the use of radioactive isotopes can selectively identify the X chromosomes, in the ordinary preparation they cannot be distinguished from other submetacentrics of the C or 6-12 group. For this reason the X chromosomes are simply included with the C or 6-12 group (Figure 2). Thus in the female with two X chromosomes there is a complement of 16 in the C group or 7 pairs of autosomes (6-12) plus one pair of sex or X chromosomes. In the male there is an unpaired X chromosome or 15 in the C group and the Y, or male sex chromosomes, resembles a small acrocentric so is included with the G or 21-22 group (Figure 3).

The chromosomes as bearers of the genetic coding material, desoxyribonucleic acid, is constant for any species of animal and is known as the genotype. Their expression in controlling embryonic development and contributing to the genetical characteristics of an individual results in the physical characteristics of a species known as the phenotype. It is reasonable then to assume that if by accidents of cell division an abnormal number of, or parts of, chromosomes should occur, an imbalance of the genetic material would be represented and an abnormal phenotypic expression of the genetic material would result. The validity of this assumption is indeed the basis for the present interest in cytogenetics.

The first recorded case of an abnormal chromosome complement being responsible for variations in the physical signs of the phenotype was described by Lejeune in 1959.[2] This author reported that the karyotypes for tissue cells from mongoloid children had forty-seven chromosomes instead of the normal forty-six, with the extra chromosome in the acrocentric or G or 21-22 group (Figure 4). This condition has been so well documented in subsequent years as to now have designated the variety of physical findings seen in the so-called "mongoloid" as being the trisomic 21 syndrome. Now although the vast majority of mongoloids do show the extra or trisomic 21 chromosome and therefore have forty-seven chromosomes, it soon became evident from the study of many

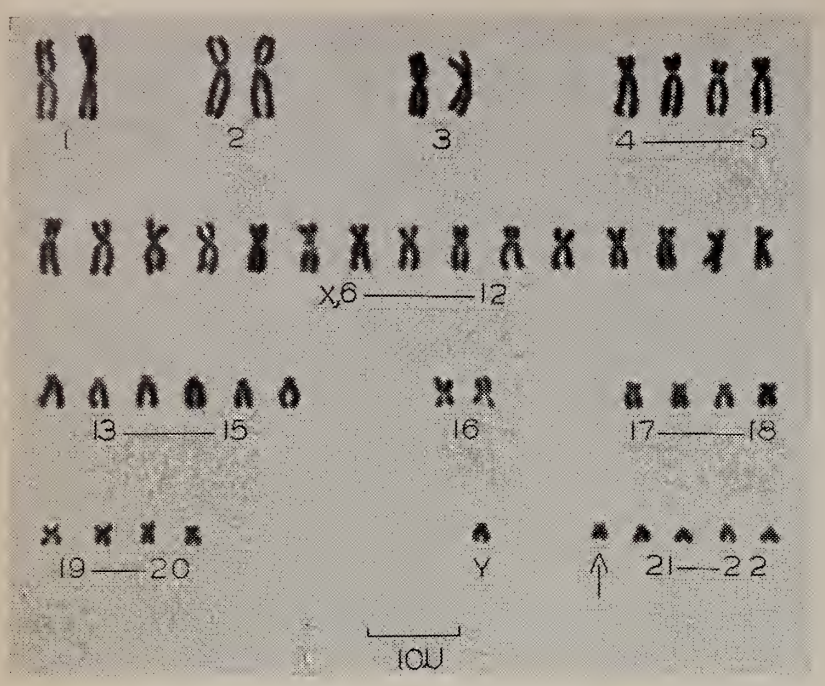


Figure 4. Karyotype of the simple or regular trisomy 21 syndrome (Down's, mongolism). U.S.D. case #120.

such cases that some mongoloids had only forty-six for the normal complement of chromosomes. On examination, however, it was revealed that only three chromosomes were represented in the 21-22 group, but an abnormal chromosome was shown in one of the other groups. Most frequently, the 21 chromosome was **translocated** onto one of the members of the D or 13-15 group. In a certain percentage of these cases, when the parents of such mongoloid children were examined, one or the other parent might show a complement of only forty-five chromosomes, one of which was this abnormal chromosome of a translocated 21 onto a 13-15. The parent would be entirely normal, or phenotypically normal, having three chromosomes in the 21-22 group, but the normal fourth chromosome translocated onto the 13-15 group. Germ cells produced by this individual could of course potentially transmit this abnormal chromosome and when united with the haploid chromosome complement of the other sex would indeed result in the mongoloid child. Other potential offspring are also possible. As additional karyotypes of mongoloid children and their parents were performed, a variety of other translocations became recognized. One such case is represented in figure 5. This is the case[3] of a female mongoloid child having only forty-six chromosomes with three chromosomes in the 21-22 group, but one additional chromosome which resembles those chromosomes in the 19-20 group. It must be assumed that this extra chromosome represents two fused or translocated 21 chromosomes. A chromosome analysis was made on the blood cultures of both parents, and the father proved to be normal. The mother, who was phenotypically normal, had only forty-five chromosomes, but one of these exactly duplicated the extra chromosome represented in the mongoloid child. This type of case illustrates the contribution which cytogenetics can make to family counseling. An analysis of the progeny which could be expected from the germ cells produced by these two parents will reveal only two possibilities. One would be a fertilized zygote having only forty-five chromosomes of which forty-three are autosomes or one short of the normal complement. There is no case as yet on record of a viable offspring with a deficient autosome. A spontaneous abortion would be the expected sequelae to a conception in this case. The other potentiality from a fertilized zygote would be one with forty-six chromosomes but showing the abnormal chromosome and, in effect, a trisomic 21 condition with the physical findings of mongolism.

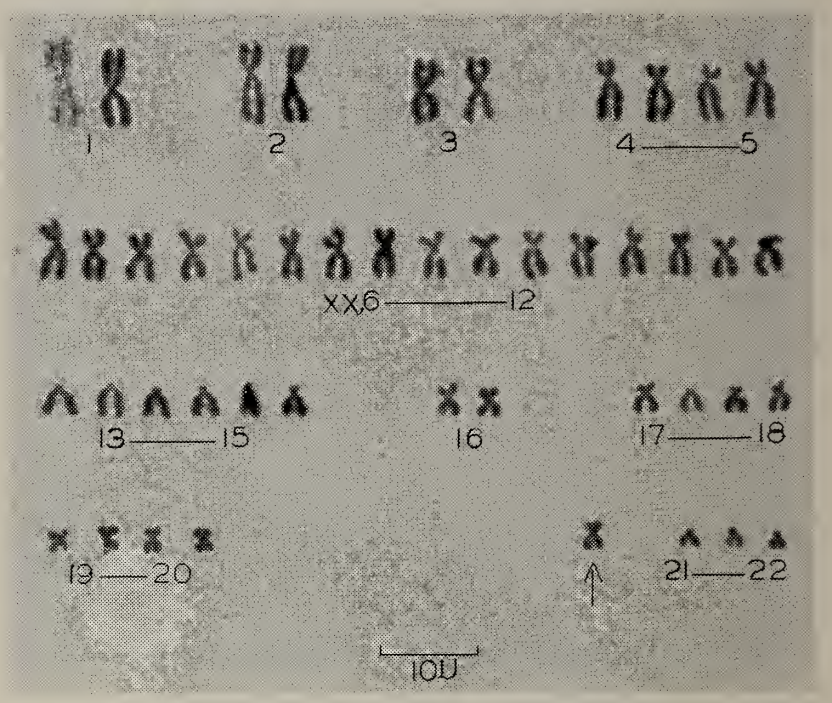


Figure 5. The karyotype of a mongoloid showing a 21/21 translocation. The marked chromosome was inherited from the mother who exhibited only two chromosomes in the 21-22 group plus the marked chromosome. She was, therefore, genotypically balanced with the equivalent of the normal 4 chromosomes in the 21-22 group and was phenotypically normal.

In addition to the trisomy 21, or Down's syndrome, there appear to be only two other syndromes caused by an extra autosome, namely an additional member to either the 13-15 group (D) or to the 16-18 group (E). These syndromes are characterized by multiple and severe congenital defects with short life expectancy. Figure 6 illustrates the karyotype of a trisomy 16-18 with the infant exhibiting characteristic signs of finger flexion, low set ears, short sternum, cleft palate, small mandible, and a patent ductus arteriosus.

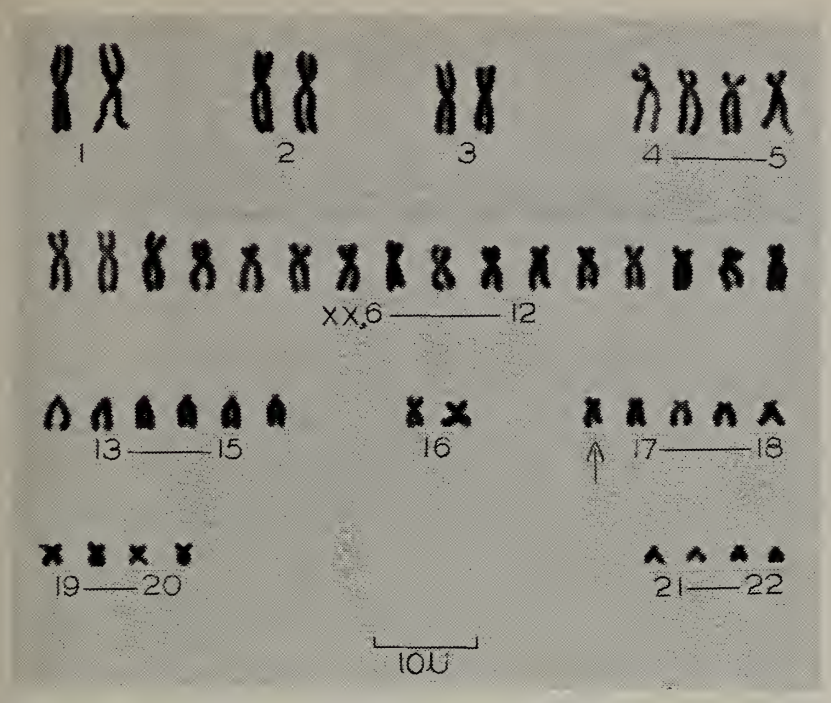


Figure 6. Karyotype of a female infant exhibiting the trisomy E syndrome. An extra chromosome is represented in the 17-18 group. U.S.D. case #116.

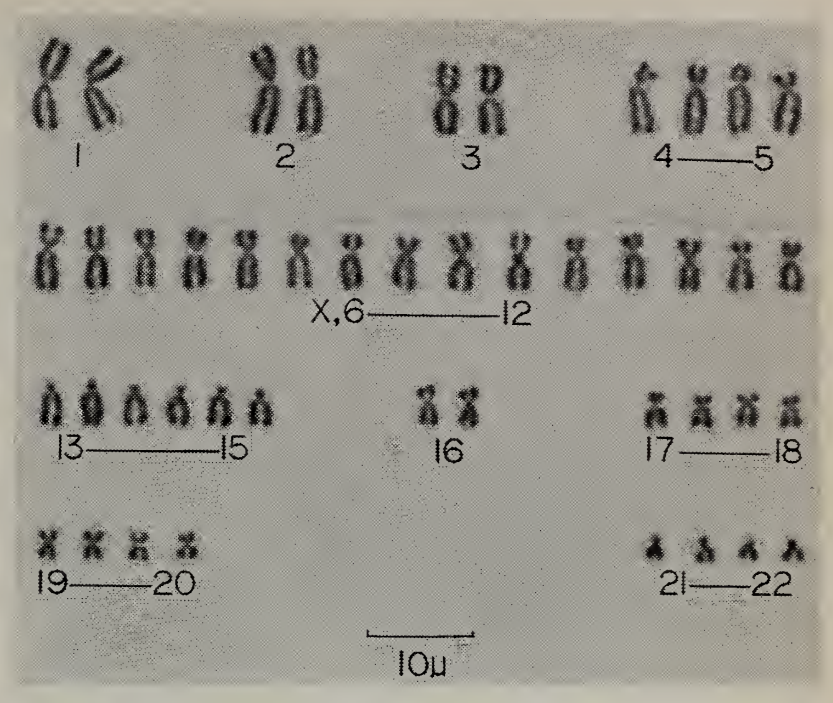


Figure 7. A karyotype which confirmed a tentative diagnosis of Turner's syndrome. One X chromosome is missing from the 6-12 group. (Courtesy Human Genetics Lab., Nebraska Psychiatric Institute).

While there appears to be only three syndromes associated with the addition of an autosome, as described in the aforementioned cases, it would be a mistake for the reader to infer these are the only autosomal anomalies responsible for aberrant development and/or metabolic disturbances. A veritable host of anomalies have been attributed to abnormal chromosome patterns, usually involving the deletion of part of a chromosome with or without translocation, or the addition of a fragment or part of an autosome.

Like the autosomes, the sex chromosomes may also be victims of accidents during either meiosis or in early mitotic division of the fertilized zygote with resultant effects not alone on sexual development but on the phenotypic expression in general. Unlike the case with the autosomes the absence of a sex chromosome is entirely compatible with life and multiple sex chromosomes are of frequent occurrence. In effect then, the sex chromosomes do exert a profound effect on embryonic development, but either the absence of one or their supernumerary occurrence does not produce such profound congenital anomalies as is the case with the autosomes. Yet unfortunately a rather common accompaniment of aberrant sex chromosomes is mental retardation, and frequently these cases are detected only when mental problems bring the patient to the attention of physicians. It likewise follows that there is apt to be a higher incidence of sex chromosome anomalies among patients of mental hospitals than in the population at large. For example, one recent survey of mental defectives kept under maximum security revealed 9 patients out of 197 had an extra Y chromosome while in the normal population the occurrence is about 1 in 2,000.

Turner's syndrome was the first to be recognized as due to the absence of one of the two X chromosomes or XO in type (Figure 7). These patients characteristically exhibit a short stature, webbed neck, infantile genital development, and primary amenorrhea which may be attributed to ovarian dysgensis. There are other clinical signs as well. It is now recognized that some of these clinical signs may also be represented in cases of supernumerary X chromosomes. These may be triple or quadruple X, or commonly a mosaic condition which may extend to cell lines in the same individual showing an XX, XXX, and XXXX sex chromosome complement. It is obvious such variations can result in quite a variety of phenotypic expressions. Unlike the classic Turner's syndrome, many cases with supernumerary X chromosomes have conceived and normal offspring were delivered.

The most common sex chromosome anomaly in the male is the Klinefelter's syndrome, characterized, in the adolescent or adult, by a small testis, absence of spermatogenesis, frequently poor androgenic response as noted in a slender eunuchoid body stature, gynaecomastia, sparse genital hair of female distribution, etc. The chromosome complement is usually 47, that is XXY, but here again, like the female, a rather wide variety of combinations of X's and Y's may be represented. Likewise, the fact that the

supernumerary sex chromosomes may exert a profound effect on congenital development is represented in the following case (Figure 8). A chromosome analysis was requested on a newborn infant exhibiting a cleft palate, low set ears, peculiar facies, and inability to thrive. It proved to have 49 chromosomes with the additional members represented as two X's and one Y.

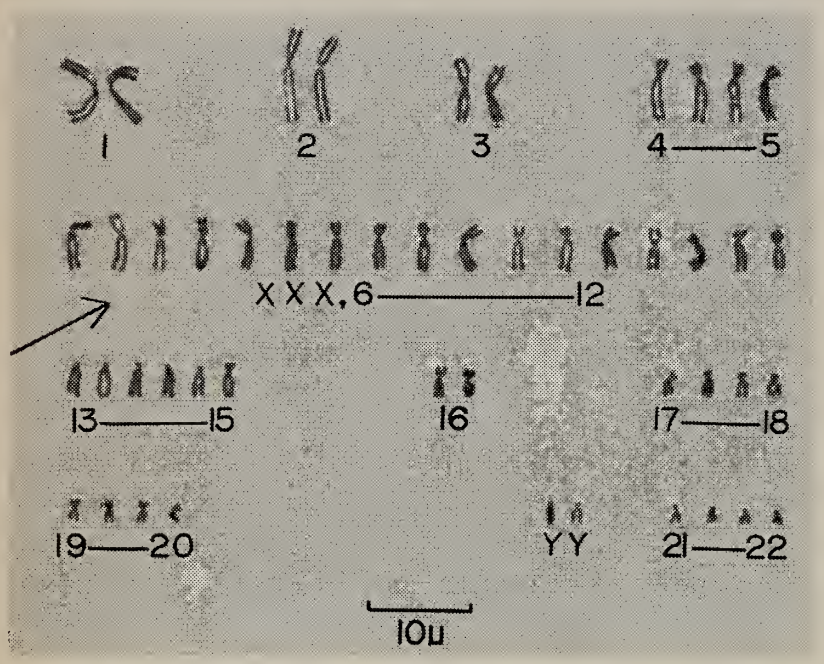


Figure 8. The karyotype of a congenitally malformed infant showing an XXXYY chromosome complement. The super-numerary sex chromosomes were confirmed by autoradiographic technic. (Courtesy Human Genetics Lab., Nebraska Psychiatric Institute).

Whereas the absence of one X chromosome, resulting in Turner's syndrome, is not uncommon, the absence of a Y chromosome in the presence of male genitalia and testis is rare. Several cases of pseudohermaphroditism have been reported wherein the karyotype is typically female. There are two well documented human cases of essentially normal males, excepting for small and infertile testes, that fail to reveal Y chromosomes in karyotypes prepared not only from blood cells but of skin and testicular biopsies. This writer[4] has reported on a pseudohermaphrodite condition in swine wherein a testis does exist in the apparent absence of a Y chromosome. Instead the animal exhibited a typical female karyotype. The Y chromosome is generally considered to be essential in the induction of the genital ridge to form semeniferous tubules.

Since this lecture was intended to be introductory to the field of cytogenetics, only selected examples of chromosome anomalies have been discussed. The literature in the field is indeed voluminous. We have necessarily had to omit discussions of clinical applications of cytogenetic studies to such multiple areas as sex determination, leukemias, cancer, virology, spontaneous abortions, and congenital defects induced by drug or radiation exposures. I have appended a selection of reference works which may be of value to the interested reader.

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Genetic Counseling*†

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In recent years physicians have become much more aware of the importance of genetics to medicine. This stems from many factors, not the least of which has been the phenomenal and continuing increase in our understanding of the basic processes of heredity.

The most direct application of this increased knowledge to clinical medicine is the provision of genetic advice. This type of counseling, which is being sought with increasing frequency by a growing sophisticated public, still competes with superstition and "over-the-back-fence" gossip, the latter invariably of a foreboding nature.

At the University of Colorado Medical Center we have a genetic counseling clinic which in general tries to help patients (usually parents) with problems arising from the occurrence in their families of serious and possibly genetic disease.

The reasons for patients coming to our clinic are multiple, some spoken, others unspoken. In many cases, no matter what the verbalized question, fear and guilt are strong underlying emotions. Most frequently these questions have to do with the desirability of a given person or persons having children. For example:

1) My sister has epilepsy. How likely are my children to be affected?
2) What are the dangers to future children of marrying my cousin?
3) We have had two retarded children. Should one of us be sterilized? What about artificial insemination?
4) Whose fault is it? (Often an unspoken question.)

Obviously an answer to any of these questions requires possession of all the available data concerning the family involved and its particular problems.

To accomplish this a good medical and social history must be obtained. In particular a pedigree, the diagrammatic representation of the family history, is constructed in the greatest possible detail. Not infrequently this requires repeated sessions with the patients since new facts will come to light after a little investigation on their part.

The pedigree may demonstrate a pattern which may suggest a specific type of inheritance (see below).

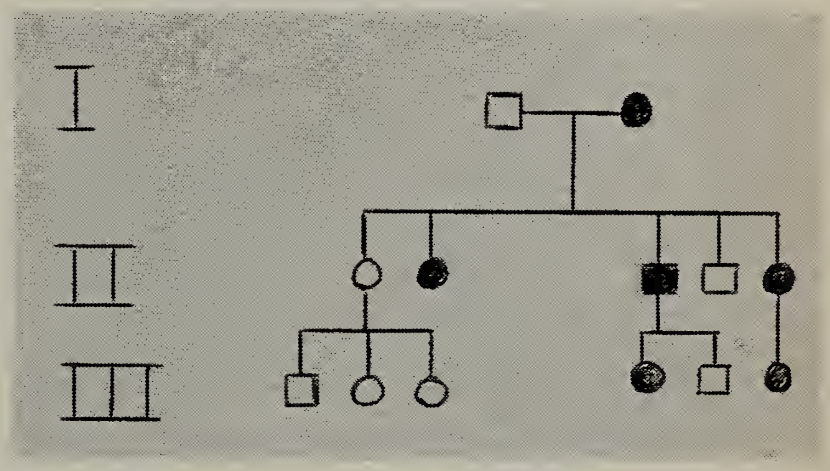


Figure 1.
PEDIGREE OF A FAMILY
WITH MARFAN'S SYNDROME
DEMONSTRATING
DOMINANT INHERITANCE

A careful physical examination and necessary laboratory tests should be performed on the "index case" (propositus) in order to make as specific a diagnosis as possible. It is often desirable to accomplish the same on near relatives, especially on parents and sibs, in order to pick up minor manifestations of the same disorder (diminished "expressivity") in them. A gene, of course, expresses itself as its phenotype (clinical manifestation) only after modification by environmental factors and even by other genes. To put it another way, the phenotype results from the interaction of genotype (genetic constitution) and environment.

Having made as accurate and as specific a diagnosis as possible (ideally a biochemical one), and having looked for minor manifestations in relatives, the counselor then has to make the following decisions:

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* From the Department of Biophysics (Contribution Number 267), aided by a Grant from The National Foundation, and from the Birth Defects Treatment Center of the National Foundation, Department of Pediatrics, University of Colorado Medical Center.
† Presented November 12, 13, 1965, School of Medicine, University of South Dakota at Symposium on "Cellular Mechanisms in Health and Disease."

1) Is the disease in question inherited? It may of course be congenital and environmentally caused (e.g. rubella syndrome). It may be a phenocopy, i.e. it may mimic a genetic disease. For example, the cataracts that occur as a result of maternal rubella infection during the first trimester of pregnancy mimic congenital cataracts which are genetically determined. Similarly, athyrotic cretinism is a phenocopy of familial goitrous cretinism, an inborn error of metabolism.
2) If it is a genetic disease, what type of inheritance is operating? There may be a single gene, chromosomal, or multifactorial inheritance involved.

Single gene defects: A careful examination of the pedigree may reveal a pattern suggesting that of a single mutant gene, either autosomal or sex-linked, and that either dominant or recessive inheritance is present, as follows:

Characteristics of Autosomal Dominant Inheritance (Fig. 1):

1) Both sexes may be affected.
2) Vertical pedigree — i.e. affected cases occur in more than one generation.
3) The disease is present in both the heterozygote and homozygote.
4) One of the parents is usually affected.
5) There is a 50% risk of recurrence in each future pregnancy of the parental mating.

Characteristics of Autosomal Recessive Inheritance (Fig. 2):

1) Both sexes may be affected.
2) Horizontal pedigree — i.e. affected cases usually appear in the same generation.
3) The disease is manifest only in the homozygote.
4) The parents are phenotypically normal carriers.
5) There may be consanguinity in the parents.
6) There is a 25% risk of recurrence in each future pregnancy of the parental mating.

Characteristics of Sex-Linked Recessive Inheritance (Fig. 3):

1) Affected individuals are usually chromosomal males.
2) Females may be carriers.
3) The disease is **never** passed from father to son.
4) 50% of the daughters of an affected male will be carriers.
5) 50% of the sons of carrier females will be affected.

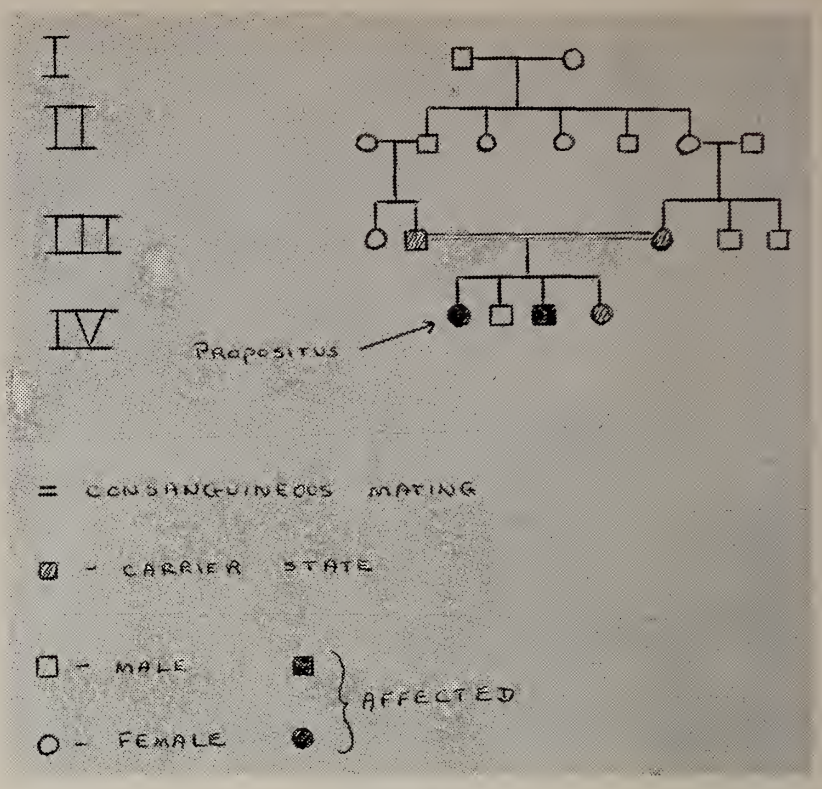


Figure 2.
PEDIGREE OF A FAMILY
WITH GALACTOSEMIA
DEMONSTRATING
AUTOSOMAL RECESSIVE INHERITANCE

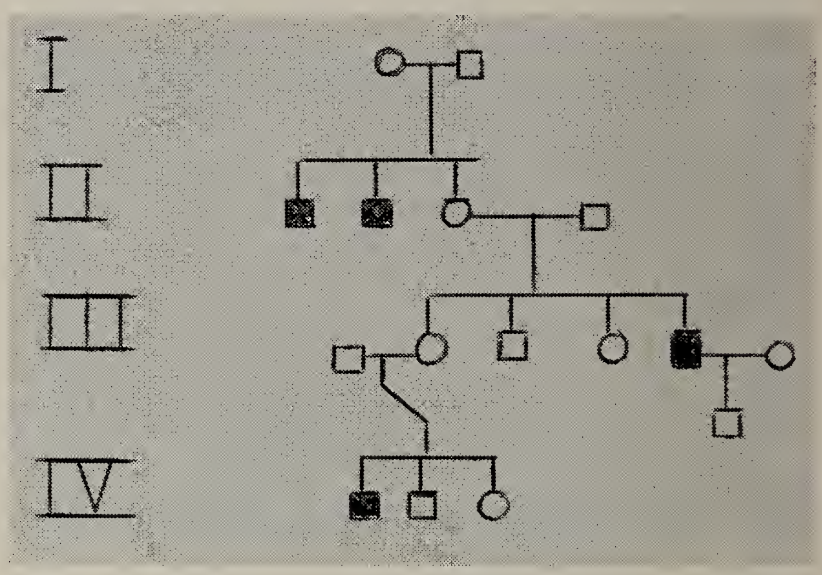


Figure 3.
PEDIGREE OF A FAMILY
WITH HEMOPHILIA
DEMONSTRATING
SEX-LINKED RECESSIVE INHERITANCE

Sex-linked dominant inheritance is rarely a problem in clinical medicine.

Chromosomal defects tend to be primarily of two types: numerical, due to non-disjunction; and morphological, due to translocation. The risk of recurrence varies greatly in the two types, exhibiting a strong dependence on maternal age in the case of non-disjunction. This is demonstrated in Table I which lists risk figures for Down's syndrome in the general population. However, when one of the parents carries an abnormal translocated chromosome the risk becomes at least 33 1/3% for each live birth.

TABLE I
INCIDENCE OF DOWN'S SYNDROME IN THE GENERAL POPULATION ACCORDING TO MATERNAL AGE

Maternal Age	Incidence of Down's Syndrome
Less than 25	1:2,000
30-35	1:600
40-45	1:100
More than 45	1:50
Among all mothers	1:600

Where multifactorial inheritance is operating, no simple pattern can be determined in the pedigree. Non-specific mental retardation, cleft lip and cleft palate, meningo-myelocele and pyloric stenosis are examples of diseases with this type of inheritance. In these cases the nature of the inheritance is obscure and one must utilize empiric risk figures often to be found in the literature. These are obtained by collecting family data from a large series of families with at least one affected member and then calculating what the actual risks of recurrence were in those families as compared to the incidence in the general population.

It should be clear that these figures give at best an **average** risk only (see Table II). In general it may be said that where the genetics is obscure, the risks for a repeat tend to be low as compared to single gene defects, being a maximum of 10% and usually being closer to 1%.

Giving Genetic Advice

In general we refuse to accept pregnant women, since a careful work-up at this time will serve no useful purpose and may increase anxiety. When the counseling is to be performed, after the work-up is completed, we insist that both members of the marital couple be present. A thorough knowledge of the personalities and background (religious, social, educational, economic) of the involved parties as well as the strength of their wish to have more children is desirable.

The counselor discusses the nature of the disease, its prognosis, and what is known about its cause and inheritance. Risk figures should not be given in a cold impersonal way, but should be interpreted. A risk of "5 in 100" may sound especially bad to some, whereas "you have 95 chances in 100 of not having a recurrence" says the same thing a little more optimistically. It is often possible to remind a couple of the 1/40 risk of malformation attending every newborn, and then to say, "your

TABLE II
EMPIRIC RISKS FOR SOME COMMON DISEASES

Mental Deficiency of unknown etiology — Incidence 3:100
- Risks among sibs
  - Both parents normal — 15%
  - One parent defective — 35%
  - Both parents defective — 85%

Anencephaly — Incidence 1:1000 — Often associated with spina bifida
- Male: female = 1:3. Incidence increases with maternal age and parity, and also in firstborn of very young mothers.
- Risk of repeat = about 3%. Risk of abnormal child or abortion = 25%.

Hydrocephalus — Incidence 1:2000 newborns
1. Occasional sex-linked recessive.
2. Often associated with meningocele or spina bifida.
3. May be non-genetic (toxoplasmosis, aminopterin, x-ray).
4. Chance of repeat of some central nervous system (CNS) anomally = 3%.
5. Chance of repeat of hydrocephalus = 1%.

(CNS) malformations in general—Incidence 29:10,000.
- Sibs six times more likely to have CNS malformation.
- Stillborn and abortion rates increased.

CLEFT LIP AND CLEFT PALATE (1)

	Cleft lip ± Cleft palate	Cleft Palate
Incidence	0.1%	0.04%
Negative Family History	4.0%	2.0%
Normal parents; relatives involved	4.0%	7.0%
2 affected children	9.0%	1.0%
1 affected parent; no affected children	4.0%	6.0%
1 affected parent; 1 affected child	17.0%	15.0%

risks are not significantly greater." This type of statement, when it may fairly be used, does much to relieve anxiety and guilt. Similarly, when dealing with a recessively inherited disease it is important to stress that the genetic defect came from **both** sides of the family.

The counselor rarely tells the couple what to do about having children. He merely states in language that is clearly understandable what the risks are. The decision as to what to do is, of course, a highly personal one depending on many factors.

Occasionally it has seemed desirable to discuss alternatives — adoption, birth control, sterilization and artificial insemination.

The art and science of medicine is complex, and genetic counseling is one of its more complex aspects. However, as a branch of preventive medicine it promises to become an increasingly powerful tool.

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Interferon Production By Virus-Infected Cells*

By
Charles R. Gaush, Ph.D.**

The fact that every human disease can be attributed to the malfunction or death of cells makes this symposium particularly important to the practicing physician. This paper concerns a recently discovered cellular response, the production of interferon by virus-infected cells. It will also deal with the significance of this response to recovery from a virus infection. The purpose of this contribution is to familiarize the general practitioner with this phenomenon and is not intended to be a critical or comprehensive treatment of the subject. For this purpose, the physician is referred to several published reviews.[1-4]

Interferon (IF) is a generic term for non-viral cellular proteins that inhibit the replication of animal viruses. However, before proceeding with a discussion of this substance it would be advantageous to review some of the current concepts of virus infections at the cellular level and also the biosynthesis of nucleic acids and proteins since these are involved in the production of interferon.

Response of Cells to Virus Infection

TABLE 1 lists the major responses of cells to virus invasion.

1) If the receptor sites on the virus and cell are not complementary, virus adsorption does not occur and there is, of course, no response since adsorption is prerequisite to infection by complete virus.

2) If the virus can adsorb and penetrate to the interior of the cell, a response may still not be observed. This may be due to several factors:

a. The cell may not be able to uncoat the virus nucleic acid.

b. The invading virus nucleic acid may be destroyed by the host cell.

TABLE 1. Response of cells to virus invasion.

1. No adsorption	No response
2. Adsorption and Penetration	No response
A. Virus nucleic acid not uncoated	
B. Virus nucleic acid destroyed	
C. Virus inactivated	
D. Cell unable to synthesize new virus	
3. Adsorption and Penetration	Virus DNA associated with host cell genome
A. Bacterial cell: Lysogeny (Phage lambda)	
B. Mammalian Cell: Virogeny (Polyoma virus)	
C. Cell is permanently altered	
4. Adsorption and Penetration	Synthesis of new virus
A. Virulent infection	
B. Cell usually destroyed	
5. Adsorption and Penetration of virus nucleic acid only	Response as in 3 or 4
A. Can circumvent the lack of adsorption in #1	
B. Significant with respect to tumor virus replication	

c. The invading virus may have been inactivated prior to adsorption.

d. The cell may not be able to synthesize new virus for reasons that remain obscure at the present time.

3) Certain types of viruses can infect cells without the synthesis of infectious progeny virus but which will have an observable effect on the cell. The nucleic acid of these viruses (always DNA viruses) becomes intimately associated with the DNA of the host cell. The cell is not destroyed but some type of heritable change is produced. It may be the production of a toxic material as in **Corynebacterium diphtheriae** or the acquisition of new antigens as in several species of Salmonella. If the host cell is a bacterium, the phenomenon is called lysogeny; if the host is a mammalian cell, it is called virogeny. The two phenomena seem to differ only in that lysogenic systems can be induced to synthesize mature virus by exposure to certain physical or chemical agents whereas this has not yet been demonstrated conclusively in virogenic systems.

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"Cellular Response in Health and Disease"
School of Medicine
University of South Dakota
12-13 November 1965

**Assistant Professor, Department of Microbiology, School of Medicine, University of South Dakota, Vermillion, South Dakota.

4) The most familiar response to virus invasion is the synthesis of mature infectious virus by the host cell which can in turn infect other cells setting up a chain reaction which results in cellular destruction and consequently, a recognizable disease. In this system, the virus nucleic acid abrogates the function of the host nucleic acid and directs the synthesis of new virus instead of host material. This is called a virulent infection and the virus uses the host cell's mechanisms for the synthesis of nucleic acid and protein. During this process, the cells are usually destroyed but may be spared or a latent infection produced if interferon is synthesized. It is this particular response that is the subject of the present discussion.

5) A very interesting and important response of the host cell is its ability to undergo a virulent infection if it is exposed to only the isolated nucleic acid portion of a virus. The virus synthesized is complete and infectious if the donor virus was capable of producing a virulent infection. In this manner, non-susceptible cells can be infected by circumventing the lack of adsorption described in [1][5] This type of response may also play an important role in latent virus infections such as Herpes simplex. Infectious virus nucleic acids may also be involved in the production of neoplastic diseases since it has been shown that the DNA of Polyoma virus (an animal tumor virus) is relatively resistant to the DNA-ases of the host organism.[6] It may also explain the inability to isolate virus particles from human neoplasms since the tumor virus may remain in the nucleic acid state, perhaps in a virogenic condition as described in [3].

Biosynthesis of Nucleic Acids and Proteins

In the preceding discussion, reference was made to the synthesis of virus nucleic acids and proteins and it is therefore essential to understand the salient features of the biosynthesis of these molecules. While it is not possible to discuss these processes in detail in this paper, a schematic summary is presented in Figure 1. For a more comprehensive treatment of this subject, the reader is referred to Ingram's excellent monograph[7] from which this illustration is taken.

In Figure 1, three essential steps involved in the biosynthesis of nucleic acids and proteins are depicted:

1. **Exact Replication** of cellular DNA which contains the genetic code. This is mediated by several enzymes, one of which is known to be DNA polymerase (the Kornberg enzyme). Their function is to produce an exact

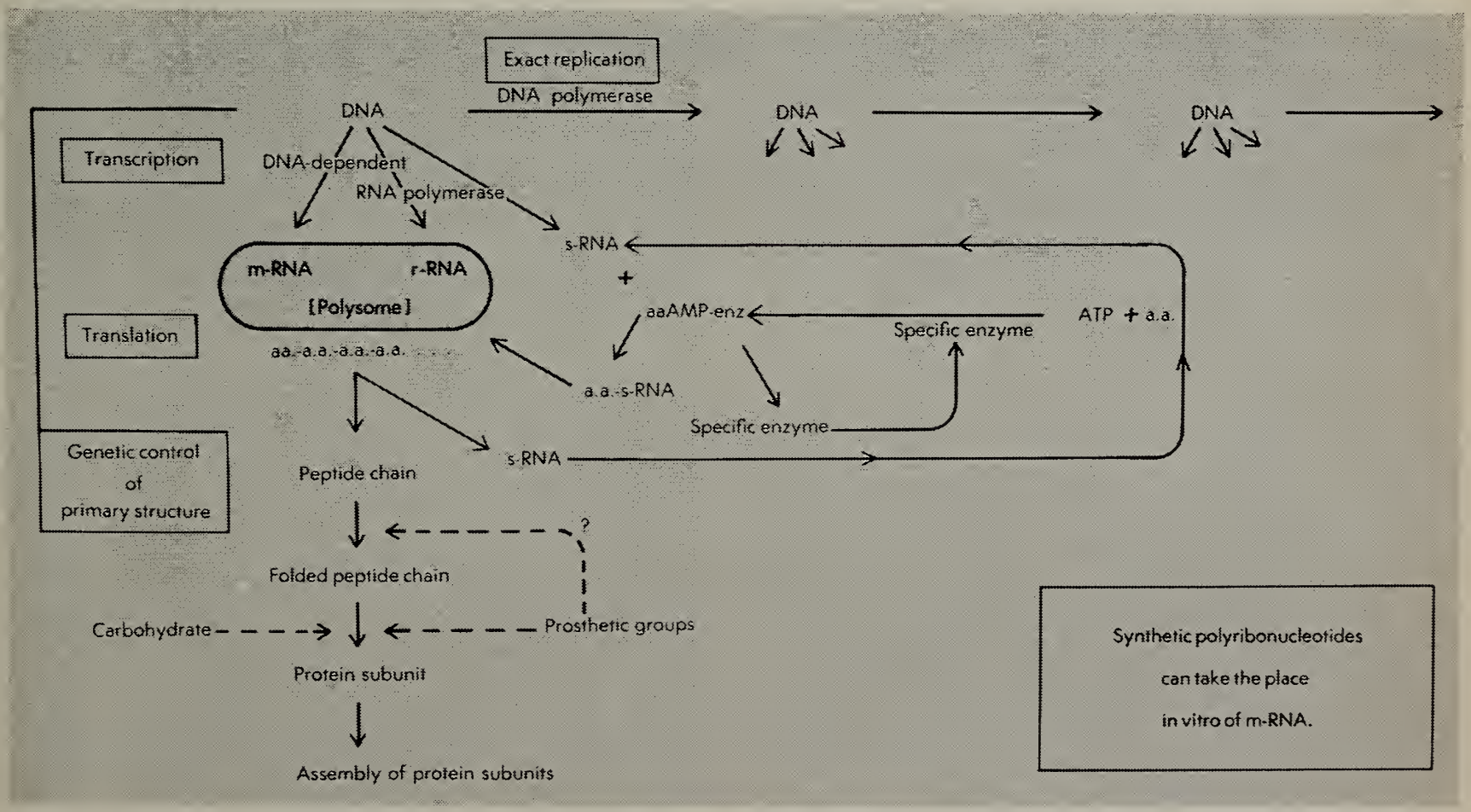


Figure 1.
The over-all scheme for DNA, RNA and protein synthesis. (**From** "The Biosynthesis of Macromolecules" by V. M. Ingram, W. A. Benjamin Co., 1965.)

replica of the DNA which in normal cells occurs during a specific period of time prior to cell division. In virus infected cells, the host cell DNA usually ceases to function and only virus DNA is synthesized.

2. **Transcription** of the DNA code into a complementary RNA code. This reaction is mediated by an enzyme called RNA polymerase which is also referred to as DNA dependent RNA polymerase since it requires a DNA molecule to act as a template or "blueprint." One of the products of this reaction is called messenger RNA (mRNA) because this molecule carries the genetic code (message) to the polysomes which are the cellular organelles responsible for the synthesis of proteins. Other RNAs synthesized in this manner are soluble RNA (sRNA) and ribosomal RNA (rRNA). The exact function of the latter is not known at the present time.

3. **Translation** of the mRNA code into a protein molecule. The sequence of amino acids determines the nature and function of a protein molecule and this sequence is directed by the arrangement of nucleotides in mRNA. This arrangement constitutes a nucleotide triplet code since it has been shown that three consecutive nucleotides specifies the placement of a single amino acid in the polypeptide chain. However, before the amino acid can be incorporated, it must first be activated by ATP and an activating enzyme that is specific for each amino acid. The activated amino acid-enzyme complex then reacts with another species of RNA, the sRNA. Each sRNA molecule is specific for each amino acid and the latter is attached to the sRNA by an ester bond, releasing AMP and the activating enzyme. The amino acid-sRNA complex then moves to the polysome (a group of ribosomes held together by a molecule of mRNA) where it is bound to the mRNA in a position directed by the nucleotide triplets. This is possible because each sRNA molecule contains a single triplet code word which is complementary to one of the mRNA triplets. As the amino acid-sRNA complexes "line-up" on the mRNA at the ribosomes, peptide bonds are formed due to the proximity of the amino acids and the presence of the required cellular polymerizing enzyme. The sRNAs are then released to be used over again and the result is the formation of a protein molecule in a matter of seconds.

Synthesis of Virus Nucleic Acids and Proteins

The process of virus DNA synthesis is essentially the same as for cellular DNA synthesis. However, the synthesis of the nucleic acids of RNA viruses differs markedly. As the scheme in Figure 1 indicates, the normal cell has no mechanism for the **exact replication** of RNA; all of the cell's RNA is made from a DNA template. It is obvious that exact replication of RNA is essential for the synthesis of RNA viruses and Baltimore and Franklin[8] have shown that a new enzyme is synthesized in cells infected with an RNA virus. This enzyme is very similar to RNA polymerase except that it requires an **RNA** template and is therefore referred to as RNA dependent RNA polymerase. To avoid confusing it with the RNA polymerase of normal cells it is called RNA replicase (or RNA synthetase). The products of its reaction are exact replicas of the infecting virus RNA which will later be incorporated into the progeny virus particles. It is clear that in this situation, the virus **RNA** is acting as a **gene** (the only situation in which this is known to occur) and also mRNA for the synthesis of the RNA replicase. In all cases of virus infection, the virus specific mRNA directs the synthesis of precursor protein which will form the protective coating of the complete virus. It is believed that the nucleic acid and precursor protein are self assembling and form complete infectious virus, a process called maturation.

Characterization of Interferon

Interferon was first discovered by Isaacs in 1957 while studying the phenomenon of virus interference.[9, 10] It can be induced* either in cell cultures or animals and embryonated eggs by a number of viruses. It has the property of inhibiting the replication of many viruses in addition to the inducing virus but it does not inactivate extracellular virus. At the present time there does not seem to be any recognizable pattern or grouping of virus-cell systems that produce interferon. For example, New Castle Disease Virus (NDV) does not produce much interferon in chick fibroblast cells (CF) whereas ultraviolet inactivated NDV (NDVuv) produces rather large amounts of interferon in these cultures. Generally, all viruses have been shown to induce interferon but avirulent or attenuated virus strains produce more interferon than virulent strains. Arboviruses are very

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* The term "induce" is not used here in the formal biochemical sense but simply indicates the production of interferon by living cells.

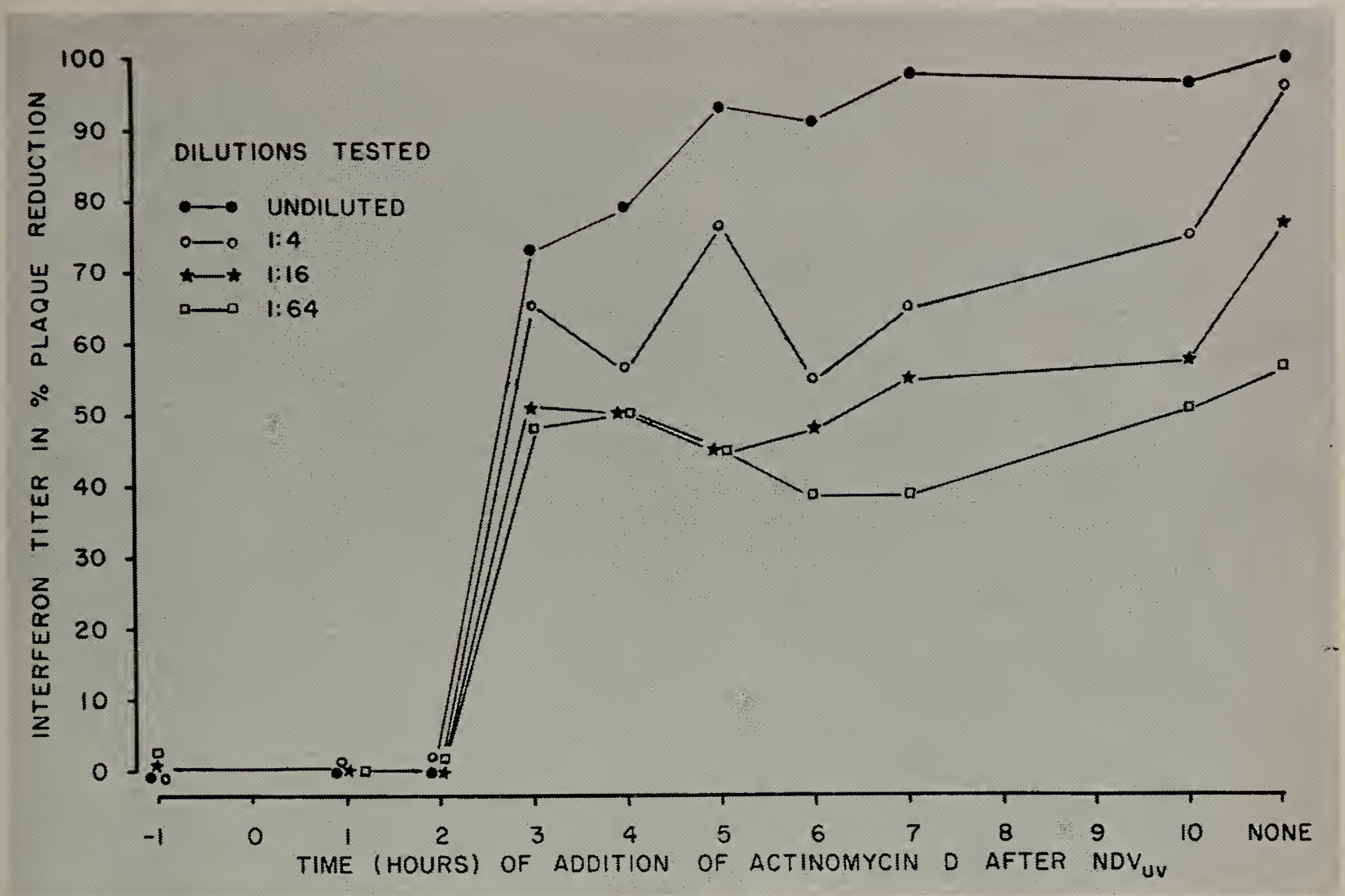


Figure 2.
The effect of Actinomycin D on the synthesis of interferon induced by UV inactivated NDV. (**From** Ho and Breinig, Virol., 25:331, 1965, Academic Press, Inc.)

sensitive to the inhibitory effects of interferon and Vesicular Stomatitis Virus (VSV) is usually used in quantitative assays. On the other hand, papovaviruses (tumor viruses) are not very sensitive to interferon. Interferons are species specific, that is, they can inhibit virus replication only in the same species of cell in which they were produced. Thus, interferon produced in monkey kidney cells is not effective in chick fibroblasts.

In order to accurately characterize interferon, Lampson **et al.**[11] prepared large quantities of crude interferon in embryonated chick eggs using the WS strain of influenza virus as the inducing agent. Beginning with about 50 liters of allantoic fluid, a 4500X purification was achieved by precipitation with perchloric acid and zinc acetate followed by chromatography on carboxymethyl-cellulose columns and electrophoresis.

The interferon thus prepared represents one of the most highly purified preparations made to date and was used to determine the physical and chemical properties of this unique substance. Chick embryo interferon has a molecular weight of 20,000 — 34,000 and contains 7.2% argenine and 11.1% lysine which accounts for its behavior as a basic protein and its isoelectric point of pH 8.0. It contains no nucleic acid or lipid but does contain trace amounts of carbohydrate which may represent residual impurities. The inhibitory activity of this interferon is destroyed by trypsin, chymotrypsin, pepsin, papain, UV irradiation and heating at 76°C for 1 hour. It is stable between pH 2.0 and 10.0 and is not sensitive to peptidases, a-amylase, lipase or DNAse.

This purified interferon inhibited a number of viruses in CF cells and its specific activity was very high; 0.0042 micrograms showed marked inhibitory properties well within the range of **in vitro** potency of such antibiotics as penicillin and tetracycline. It is inactive if given therapeutically and must be administered prior to infection with the challenge virus.

Mechanism of Synthesis

Interferon is a cellular protein whose synthesis is directed by the cell's genome. This is demonstrated by the fact that interferon syn-

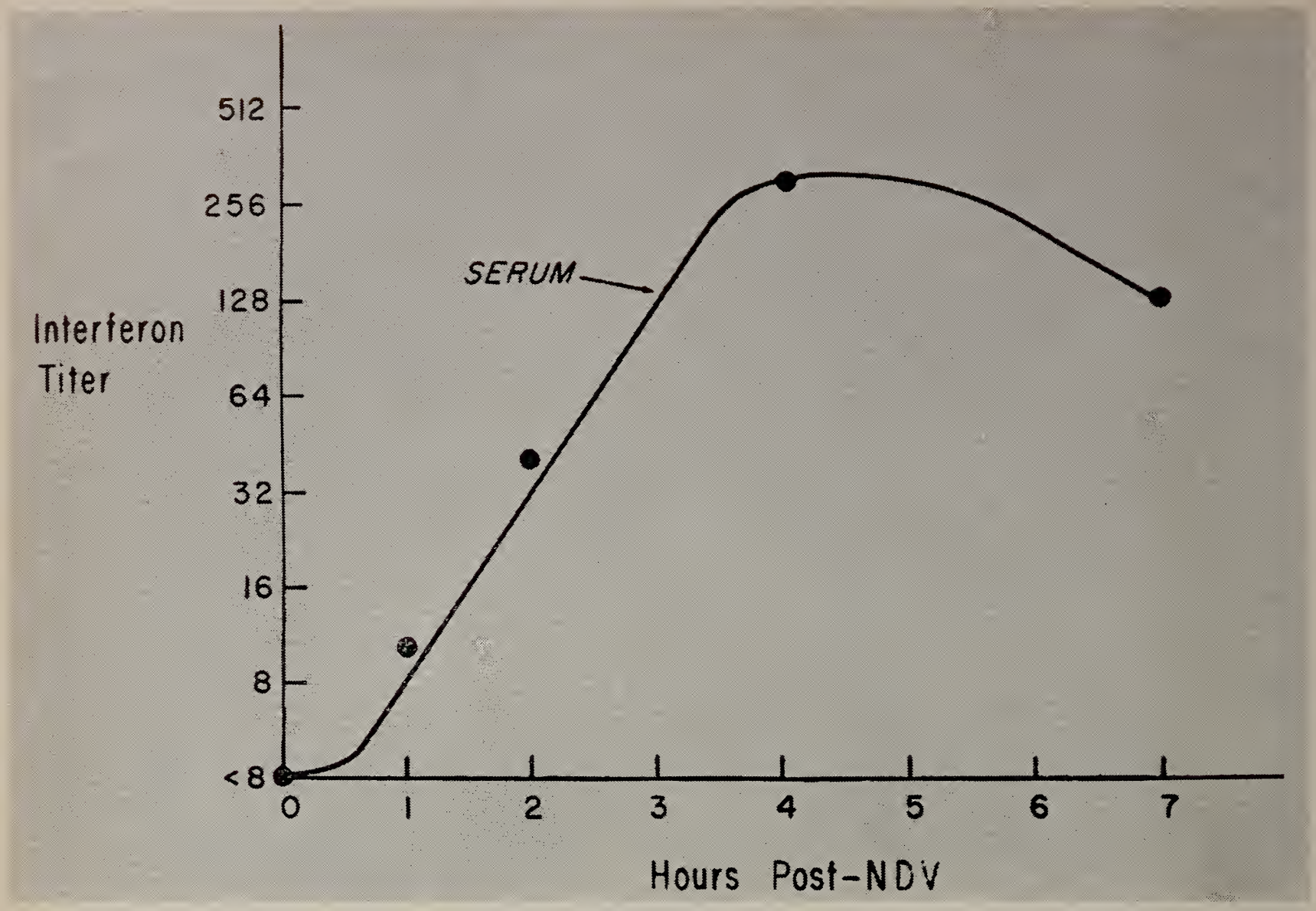


Figure 3.

Interferon titers in mouse sera at intervals after intravenous inoculation of $10^{7.9}$ plaque forming units of NDV. (**From** Baron and Buckler, Science, 141:1061, 13 September 1963.)

thesis can be inhibited by the antibiotic actinomycin D which binds to DNA and prevents its utilization as a template for the transcription of the DNA code into mRNA.[12] Since actinomycin does not bind to RNA, many RNA containing viruses replicate in the presence of this antibiotic but without the concomitant production of interferon. This has been observed many times and the absence of interferon in these systems usually results in a higher yield of virus. (Actinomycin D, of course, inhibits the replication of DNA containing viruses). Ho[13] has shown that interferon synthesis is inhibited in CF cultures if actinomycin is introduced up to two hours after addition of NDVuv (Figure 2). This indicates that interferon transcription and translation from the cell's genome occurs during the first two hours after infection. In Figure 2, the word "none" on the X axis indicates the yield of interferon observed if actinomycin is omitted from the system.

Interferon can be induced in animals by introducing large amounts of virus to simulate a natural infection. Baron[14] injected NDV in mice intravenously and found that interferon was produced rapidly reaching maximum titers at 4 hours (Figure 3). In **in vivo** systems the interferon gradually falls to very low levels within 24-48 hours since it is taken up and bound firmly by other host cells. Figure 4 describes the production of interferon in CF cell cultures by NDVuv.[13] In **in vitro** systems the level of interferon remains high and can be reduced only by diluting the tissue culture medium. In this manner, Glasgow and Habel[15] maintained an inverse relationship between the concentration of interferon and vaccinia virus over a period of more than a month (Figure 5).

Interferon can also be produced by cells if they are exposed to certain polysaccharides. Statolon (from mold)[16] and bacterial endotoxins[17, 18] stimulate the production of interferon. In addition, Youngner and Stinebring[19] observed the production of interferon in chickens injected with **Brucella abortus.** These agents, as well as nucleic acids,[20] are (or contain) large polyanions and the current hypothesis for their ability to produce interferon is

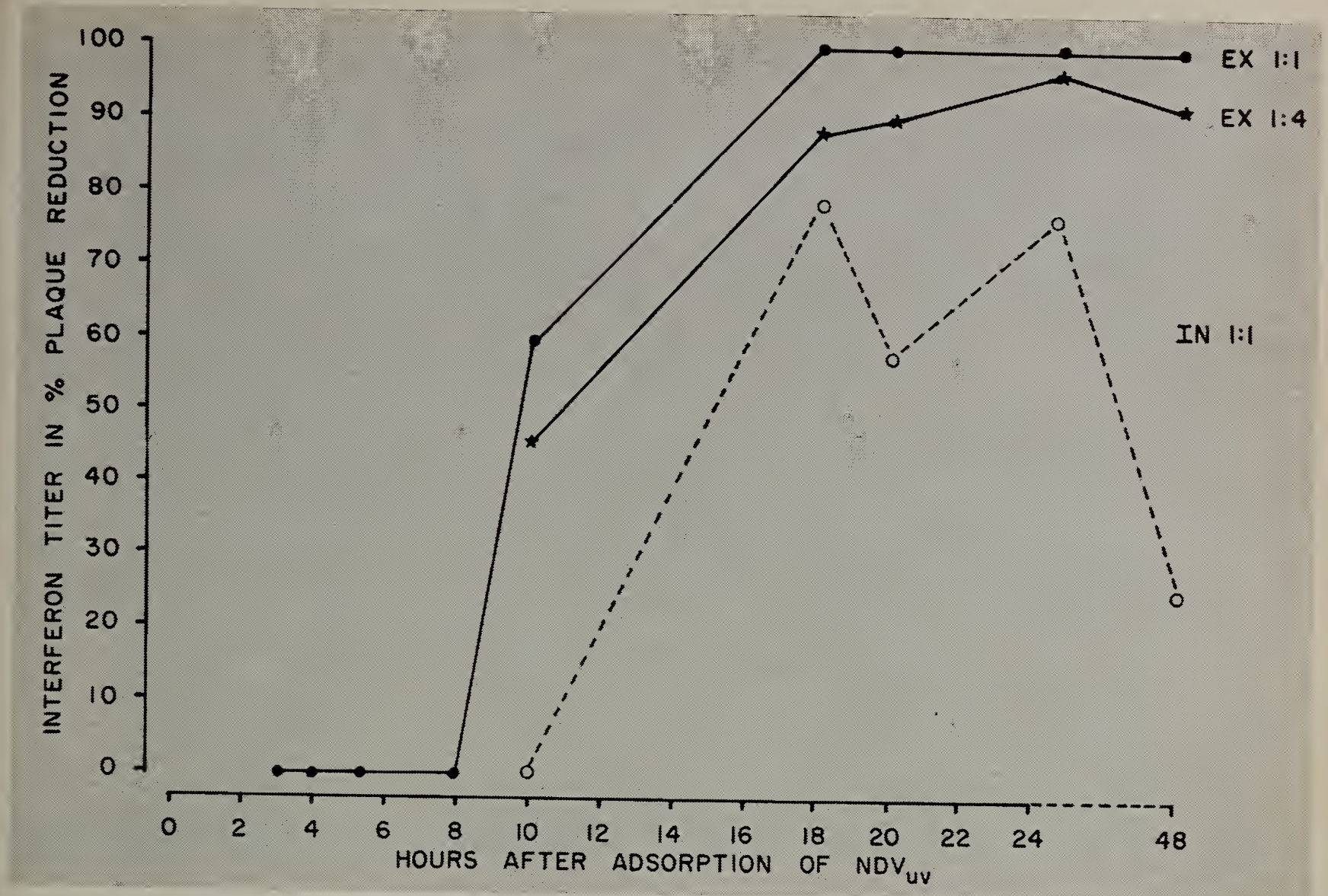


Figure 4.
The production of interferon in chick fibroblast cells by UV inactivated NDV. (**From** Ho and Breinig, Virol., 25:331, 1965, Academic Press, Inc.)

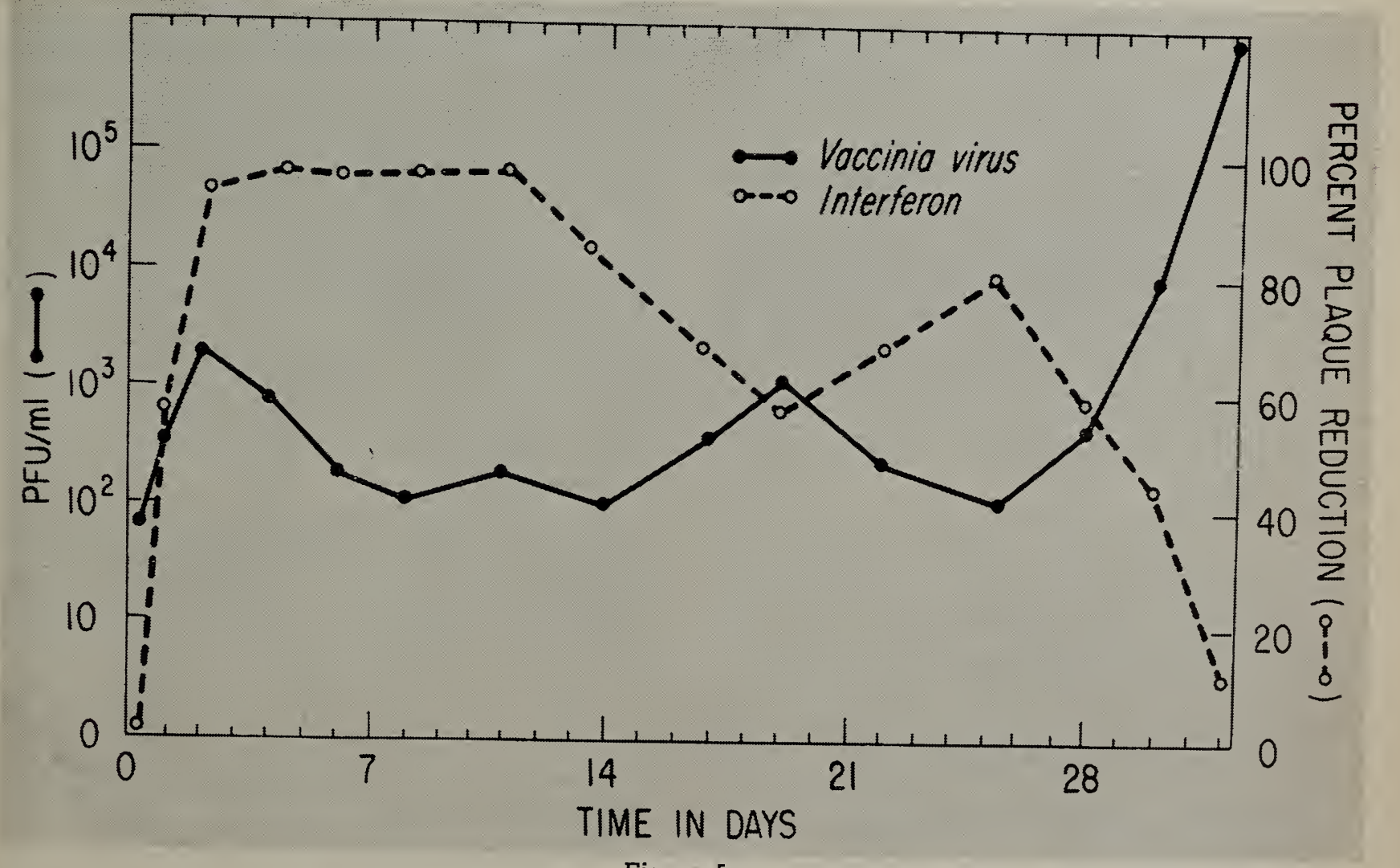


Figure 5.
The inverse relationship between the concentration of interferon and vaccinia virus in cell cultures. (**From** Glasgow and Habel, J. Exp. Med., 115:503, 1962, The Rockefeller University Press.)

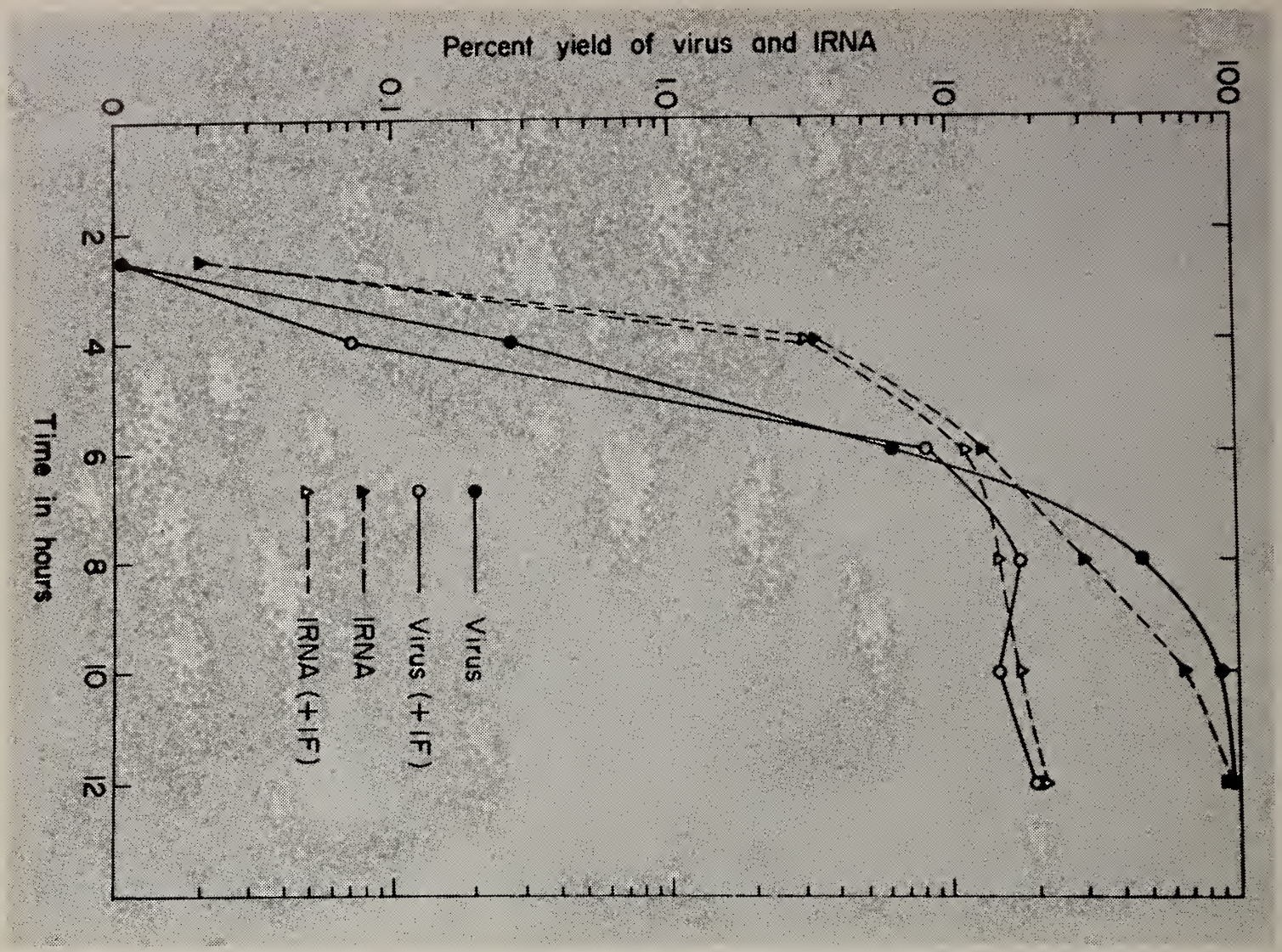


Figure 6.

The inhibition of synthesis of infectious virus RNA by the addition of exogenous interferon at 2½ hours after infection of cultures with WEE virus. (**From** Lockart, Virol., 18:493, 1962, Academic Press, Inc.)

that they act as derepressors; i.e., they presumably combine with or remove a histone repressor from the DNA responsible for coding the interferon molecule.[21] It therefore appears that many different polyanions induce the synthesis of interferon, including non-viral nucleic acids and this seems to be the cell's defense mechanism against foreign nucleic acids. More recent investigations have revealed that the interferons induced by nucleic acids and polysaccharides differ in molecular weight, the nucleic acid induced product having a lower molecular weight.[22]

Mechanism of Action

Contrary to previously published reports, the highly purified interferon prepared by Lampson **et al.**[11] was antigenic, did not uncouple oxidative phosphorylation, did not stimulate aerobic or anaerobic glycolysis, and did not affect glucose utilization or lactic acid production. These effects were presumably due to other substances contained in the unpurified preparations of interferon previously used.

Interferon synthesized by cells is liberated into the surrounding medium and is taken up by other cells making them refractory to virus infection. Using special techniques to isolate infectious virus RNA (IRNA) from cells infected with Western Equine Encephalitis virus (WEE), Lockart[23] found that exogenous interferon specifically inhibited the synthesis of virus RNA. The data in Figure 6 illustrates a 10-fold reduction in IRNA that was observed when interferon was added to cells 2½ hours after infection with virus. This time was selected to show that virus RNA synthesis initiated in the usual manner was abruptly inhibited by the added interferon.

TABLE 2. Yields of virus in SFV-infected CEF cells treated with actinomycin after interferon treatment.

Pretreatment of Cells		Yield of virus at 7 hours
Interferon	Actinomycin	(PFU x 10^6/plate)
-	-	440
-	+	480
+	-	2
+	+	26

(from Taylor, Virology, 25:340, 1965; Academic Press, Inc.)

By pretreating CF cultures with interferon and then actinomycin, Taylor[24] observed that

the inhibitory effect of the interferon was reduced (TABLE 2). Pretreating the cells with neither interferon nor actinomycin produced the expected amount of Semliki Forest virus (SFV) and pretreatment with actinomycin alone did not affect the virus yield since SFV is an RNA containing virus. Pretreatment with interferon alone produced a 200-fold reduction in virus yield as would be expected since SFV is sensitive to the action of interferon. However, if the cells were pretreated with exogenous interferon followed by actinomycin, the expected reduction in virus yield caused by the interferon was not observed. Instead, the actinomycin produced nearly a 15-fold increase in virus yield. These data suggest that actinomycin inhibited the action of interferon and Taylor[24] found that a more complete inhibition of interferon activity could be obtained if actinomycin was added simultaneously with (or before) interferon. The results suggest that actinomycin prevents the synthesis of a new cellular protein induced by the presence of exogenous interferon. Similar results had been reported previously by Lockart.[25] This new protein, perhaps a ribonuclease, appears to be the true active component which inhibits the synthesis of virus RNA. If the challenge virus is a DNA virus, the interferon induced protein could prevent its replication by inhibiting the synthesis of mRNA polymerized on the virus DNA template.

Effect of Interferon on the Outcome of Virus Diseases

The data presented indicate that cells respond to the presence of virus nucleic acids by the production of interferon. That interferon is responsible for the recovery of patients from primary virus infections is suggested by two major facts. One is that physiological amounts of specific antibody do not seem to inhibit the course of virus infections after their establishment.[26] The reasons are that the action of antibody is extracellular while virus replication is an intracellular process. Viruses can also infect adjacent cells without passing through an extracellular phase as is commonly seen in cell cultures in the presence of specific immune serum. The virus may also infect other cells in the form of its infectious nucleic acid. This may be accomplished by the infection of adjacent cells or by way of an extracellular route. In the latter situation, the nucleic acid would not be neutralized by specific antibody and in some cases the nucleic acid would not be rapidly degraded by host serum DNAses. Another important factor mentioned by Baron[26] is that the time required for neutralization of complete virus by specific antibody allows some viruses to escape neutralization and these particles adsorb to susceptible cells, thus continuing the infection. It is also known that a fraction of virus resists neutralization regardless of antibody concentration. Finally, the concentration of antibody observed during the acute phase of a virus disease is usually rather low and its role in recovery from infection is probably not significant.

The second factor is the interesting phenomenon of patients suffering from hypogammaglobulinemia. These patients can not synthesize sufficient antibody to be detectable yet they seem to recover from virus infections as easily as those not so afflicted.

Interferon, however, is synthesized rapidly and to a high titer after exposure of cells to viruses. It is very potent, 0.0042 micrograms producing a significant protective effect. Interferon titers are highest when virus replication is at a maximum, usually just before significant clinical symptoms appear, whereas antibody titers reach a maximum sometime **after** clinical illness. Interferon has been detected in humans with virus diseases[27] and has been produced **in vitro** by infecting human leucocytes with viruses.[28]

Figure 7 represents, in schematic form, a hypothetical virus infection. Virus replication begins after the first day and the amount of virus reaches a peak on about the third day. Clinical symptoms are maximum on about the fourth day with the interferon titer being the highest between the third and the fourth day. Circulating antibody can be detected after the second day but does not reach significantly high levels until eight or ten days. The diminution of virus and clinical illness seems to be more closely related to the presence of interferon than to the presence of antibody. Actually, this scheme is similar to what is observed when mice are infected with influenza virus and may also be representative of the common cold observed in humans.

Since interferon is a rather potent inhibitor of virus replication, its use has been proposed as a therapeutic agent. However, several factors would contraindicate its use for this purpose. One is that interferon must be given prior to the development of clinical disease since during the acute phase, virus induced cellular damage is greatest and the use of interferon at this time probably would not affect the outcome of

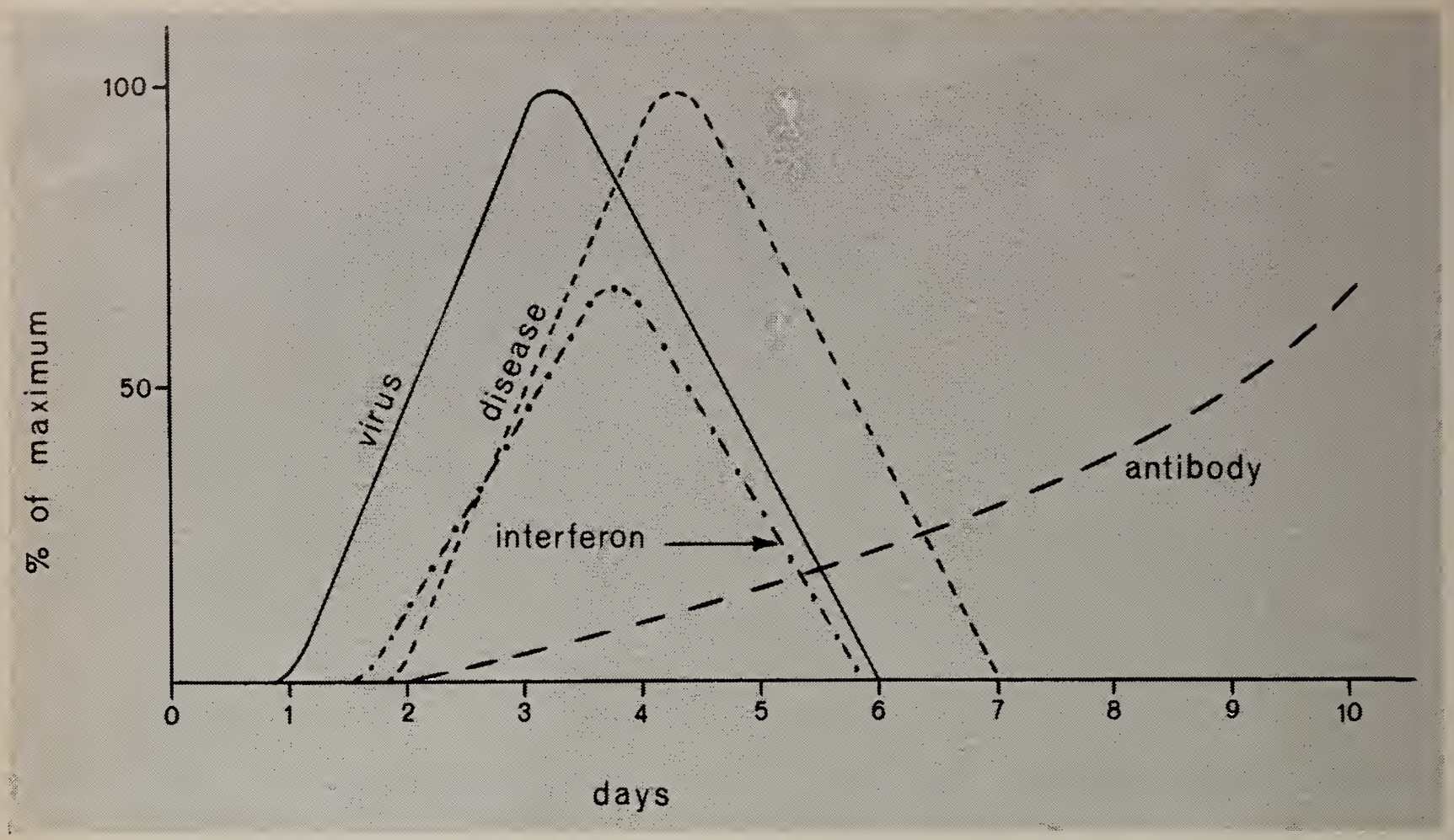


Figure 7.

A schematic representation of a hypothetical virus disease showing the appearance of virus, clinical symptoms, interferon, and specific antibody. The level of interferon is drawn here at less than maximum simply to avoid confusion in the illustration.

the illness. In addition, the physician usually does not see a patient with a virus disease until **significant** clinical symptoms have appeared. Secondly, pure interferon would be too expensive to prepare in commercial quantities. Its only possible use would be in epidemic conditions when it is known that large numbers of the population would be exposed to a virulent virus. Perhaps it would then be feasible to administer large amounts of harmless polyanions which would induce the synthesis of interferon in the recipient. In this situation, the recipient then could synthesize his own interferon efficiently and this interferon should confer a significant degree of protection against the virus.

From all the available data, one can conclude that the host has two basic defense mechanisms against virus infections. One is the synthesis of interferon which is immediate and seems to be responsible for the recovery of an immunologically inexperienced host from an infection. The second is the synthesis of specific antibody which protects the host from reinfection with the same or closely related viruses.

Acknowledgement: The author wishes to thank the authors and publishers indicated for their kind permission to reproduce the illustrations used in this report.

Note added in proof. Since this talk was presented, it has been found that interferon is a slightly acidic protein rather than a basic one as described in the earlier literature (J. S. Youngner, 1966, Personal Communication). In addition, mice that had not been stimulated by polyanions produced interferon following the injection of cyclohexamide (a protein inhibitor) showing that some preformed interferon exists in the tissues of animals (J. S. Youngner, et. al., Virology, 27:541-550, 1965).

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The Possible Role of Bacterial L-Forms in Disease*

Paul F. Smith, Ph.D.
Professor and Chairman
Department of Microbiology,
School of Medicine,
University of South Dakota,
Vermillion

The problem of bacterial disease, once thought controllable by antibiotic and chemotherapeutic agents, has defied solution. In spite of modern therapy and the emphasis placed on preventive medicine, no conclusive explanations have been made for epidemiological spread of disease, reservoirs of infection, latency of infection, and sequelar disease. The academic community for many years has been aware of the existence of a group of microorganisms called **Mycoplasma** (pleuropneumonia-like organisms; PPLO) and of a peculiar transformation of bacteria to a morphological state called the L-form under the influence of inhibitory agents. The former organisms were implicated in certain abacterial genitourinary tract infections of man for over two decades without arousing any significant curiosity in the medical profession. The recent demonstration of a species of **Mycoplasma, M. pneumoniae,** as the probable causative agent of Eaton's primary atypical pneumonia and the isolation of organisms of this group from leukemic bone marrows has stimulated needed interest. Bacterial L-forms still remain the province only of the academic microbiologist. The purpose of this presentation is to acquaint the practicing physician with the possible potential of bacterial L-forms in understanding unsolved medical problems. Since no conclusive facts are available, this paper will serve only to provoke serious thought.

It will be evident from the following discussion that similarities exist between L-forms and **Mycoplasma.** Since **Mycoplasma** are found in nature and are implicated in disease, a corollary may be that L-forms are involved in disease. Hence, an understanding of both types of organisms and their possible interrelationship is required.

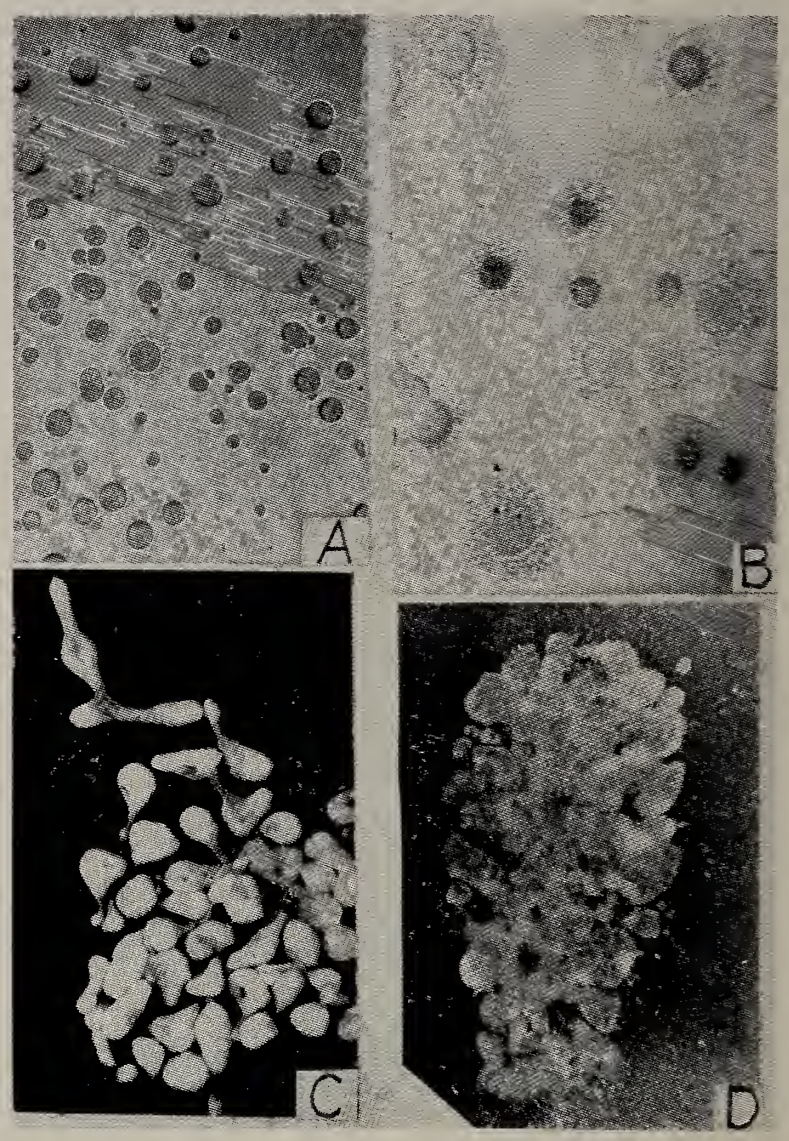


Figure 1. A. Colony of **Mycoplasma salivarium.**
B. Colony of L-form of group A streptococcus.
[A and B: Official U. S. Navy photographs, Courtesy Y. E. Crawford, Great Lakes, Illinois.]
C. Individual organisms of **M. mycoides.** [Courtesy A. Rodwell, Melbourne, Australia.]
D. Enlarged colony of L-form of **Proteus** showing individual organisms.
[Courtesy of copyrighter, N. Y. Academy Sciences and author, K. Liebermeister, Munich, Germany.]

Definition of the Organisms

Mycoplasma are plastic microorganisms, vesicular or filamentous in form, with minimal reproductive units of diameter 125-200 mu. Bacterial L-forms are somewhat larger (300-1000 mu) but possess a plastic vesicular nature sim-

* Presented November 12 and 13, 1965, School of Medicine, University of South Dakota, at the Symposium on "Cellular Mechanisms in Health and Disease."

ilar to the **Mycoplasma.** Both types of organisms produce the typical fried egg shaped colony caused by the penetration into the agar gel of the organisms at the center of the colony. The size of and morphology of the colonies are variable, particularly upon initial isolation. Generally, the average colony diameter is about 100 u (Fig. 1). The mode of reproduction is disputed. Binary fission, budding, filament formation followed by fragmentation, and swelling into a "large body" followed by fragmentation all are advanced. This dichotomy of opinion is due principally to the plastic deformative nature of both organisms.

The plasticity is the result of lack or loss of the rigid cell wall responsible for the shape of bacteria. The absence of the key chemical constituents of this wall is shown in TABLE 1. The pattern of sensitivity to antibiotics, particularly to those which act by inhibition of bacterial cell wall synthesis, e.g., penicillin, methicillin, and cycloserine, are identical with both **Mycoplasma** and bacterial L-forms. Likewise, L-forms are not bacteriophage susceptible because no attachment sites remain. No phage have ever been detected for the **Mycoplasma.**

TABLE 1. Bacterial Cell Wall Constituents of **Mycoplasma** and L-forms.

	Mycoplasma	Stable L-forms
Hexosamine	+	+
Hexoses	+	+
Diaminopimelic acid	0	0
Muramic acid	0	0
Peptides	+	+

The similarities of both types of organisms extend further. Both are surrounded by the typical unit membrane which surrounds all cells, plant or animal. This unit membrane appears as a three layered structure, the two outer layers being electron dense, the inner electron transparent. Membranes of **Mycoplasma** and L-forms differ from that of the bacterium or other plant cell in having acquired a high degree of osmotic stability. In other words, these organisms, in contrast to bacteria stripped of their cell wall, are capable of survival, growth, and reproduction in a hostile osmotic environment. The manner in which this stability is achieved is not known but suspicion is placed upon the lipid components of the membrane.

Comprehension of the nature of L-forms necessitates their subdivision into two types based upon the need for increased inorganic salt for survival and growth. Generally, but not exclusively, L-forms derived from gram-positive bacteria are salt-requiring. The level of the requirement can be reduced by increasing the serum content of the culture medium. This requirement is not explainable solely as an osmotic need. It appears that cations may stabilize the membranes by bridging phosphate groups on the phospholipid molecules in the membrane. The lipid content of salt-requiring L-forms is similar to the bacteria from which they were derived (TABLE 2). In contrast, most L-forms from gram-negative bacteria do not require high concentrations of salt and hence resemble **Mycoplasma** in this respect. The lipid content of these two types is elevated well above that of the salt-requiring L-forms and the bacteria (TABLE 2).

TABLE 2. Quantitative Lipid Composition of Mycoplasma and L-forms.

	Total Lipid	Unsaponifiable Lipid	Phospholipid
	% Dry weight cells		
Mycoplasma	8-15	5- 8	3-7
Salt-nonrequiring L-forms	8-19	3-11	5-8
Salt-requiring L-forms	3- 5	1- 2	1-2
Parent bacteria	1- 4	1- 2	1-2

The respiratory activities of **Mycoplasma** and L-forms are analogous (TABLE 3). Two metabolic types of **Mycoplasma** exist, namely, those which utilize sugars as a carbon and energy source and designated fermentative and those which utilize fatty acids as a carbon and energy source and designated nonfermentative. The L-forms have been subdivided previously. From TABLE 3 it can be seen that the respiration of the fermentative **Mycoplasma** and the L-forms from gram-positive bacteria is terminated at the flavoprotein level, i.e., respiration concludes

TABLE 3. Respiratory Pathways in Mycoplasma and L-forms.

	Mycoplasma		L-forms from	
	Fermentative	Nonfermentative	Gram-positive	Gram-negative
Lactic DH*	+	+	+	+
Succinic DH	+	+	+	+
Acyl CoA DH	+ or 0	+	?	?
$NADH_2$ Oxidase	+	+	+	+
$NADPH_2$ Oxidase	+	+	+	+
Diaphorase	+	+	?	?
Quinone reductase	0	+	0	+
Cytochrome reductase	0	+	0	+
Cytochrome oxidase	0	+	0	+
Catalase	0	+	0	+

*DH = dehydrogenase

with the reduction of some organic or inorganic molecule other than oxygen. Contrarily, the respiration of non-fermentative **Mycoplasma** and L-forms from gram-negative bacteria is cytochrome terminated, i.e., respiration culminates in the production of water. Further definitions of the respiratory path in L-forms state (1) if the parent bacterium is gram-positive, its L-form does not contain the cytochrome portion of the respiratory chain no matter what the nature of this chain in the parent organism; (2) the L-form of a gram-negative bacterium possesses the same respiratory chain as its parent organism (Weibull and Gyllang, 1965). These findings are explained by examination of recently detected internal membranous structure, called the mesosome. It is an extension of the cytoplasmic membrane, is found coiled in the cytoplasm and probably is analogous to the mitochondrion of cells of higher organisms, i.e., contains the terminal respiratory chain. This structure is found principally in gram-positive bacteria and is lost upon L-transformation. The terminal respiratory chain of gram-negative bacteria is believed associated with the extracytoplasmic cell membrane. An analogy can be visualized (1) between fermentative **Mycoplasma** and L-forms of gram-positive bacteria and of L-forms derived from gram-negative bacteria which lack cytochromes and (2) between non-fermentative **Mycoplasma** and L-forms derived from gram-negative bacteria which contain cytochromes.

Summarizing, **Mycoplasma** and L-forms possess similarities with respect to (1) morphology (2) mode of reproduction (3) antibiotic sensitivity (4) absence of bacteriophages (5) lipid composition and (6) metabolism. However, none of this evidence is conclusive, nor does it pose a clinical question.

L-transformation and Reversion in vitro

Further insight into the basic properties of L-forms is necessary to understand the final proposition that L-forms may be of significance in clinical disease. One must examine how L-forms are produced, and if and how they can revert to the parent bacterium.

A fundamental difference advanced to differentiate L-forms from **Mycoplasma** is that the latter are found in nature but L-forms are laboratory-induced artifacts. What is not considered is that if an L-form were isolated from nature, it would be considered a **Mycoplasma** for its bacterial origin would not be evident.

The prototype L-form is L-1 which occurs spontaneously in cultures of **Streptobacillus moniliformis,** a causative agent of rat bite fever (Klieneberger, 1942). It was considered a member of the **Mycoplasma** for years until Dienes (1947) proved its origin. Spontaneous L-transformation also occurs with **Bacteroides.** Dienes subsequently produced L-forms from most genera of bacteria by use of agents deleterious to cell walls. Examples are the use of penicillin to produce L-forms of **Proteus,** high concentrations of amino acid (glycine, methionine and phenylalanine) to produce L-forms of **Salmonella** and **Hemophilus,** and antisera to produce L-forms of **Salmonella typhosa** (Dienes and Weinberger, 1951). The discovery of the high salt requirement for some L-forms (Sharp, 1954) resulted in the production of L-forms of pneumonococci, streptococci and staphylococci. Thus the L-forms have been produced **in vitro** by the use of agents employed in treatment of or by host factors mobilized against bacterial infections.

Some L-forms immediately revert to the bacterial form upon removal of the inducing agent. Others remain in the L-form state indefinitely after transfer to culture media lacking the inducing agent. The latter type are called stable L-forms and are the only type considered in this presentation. Reversion of the stable L-forms has been accomplished **in vitro** by several methods including growth in liquid instead of solid medium, the addition of yeast extract to, and the removal of blood serum from the culture medium. The resulting bacteria are identical to the bacteria from which the L-forms were derived. Examples are L-forms of beta-hemolytic streptococci (Y. E. Crawford, unpublished data), **Proteus mirabilis** (Altenbern, 1961), and **S. moniliformis** (Dienes, 1947).

Circumstantial evidence has been obtained to indicate that organisms classified as **Mycoplasma** have reverted to bacterial forms **in vitro.** A culture of avian species which causes chronic respiratory disease gave rise to a bacterium similar to **Hemophilus gallinarum** (McKay and Taylor, 1954); species isolated from the genito-urinary tract of man gave rise to diphtheroids which exhibited metabolic and serological similarities to the **Mycoplasma** (Smith, et al., 1957; Smith and Rothblat, 1960); the reversion of a **Mycoplasma** isolated from the human urethra was followed microscopically (Wittler et al., 1956). All these reported reversions appeared well controlled. Contamination and impure cultures were statistically improbable yet none of these instances offered unqualified proof of an identity of L-forms and **Mycoplasma.** At

most, only a relationship between the two organisms can be assumed, particularly because of recent results of studies on the homologies of the deoxyribonucleic acids (DNA) of certain **Mycoplasma** and the suspected bacterial parent. DNA, of course, contains the genetic code. Therefore, organisms with closely similar or identical properties would have similar DNA molecules. Similar or identical DNA molecules not only have similar chemical composition but also possess the ability to bind one another. Similarity of these properties has been demonstrated using the DNA of known L-forms and their bacterial parents but none of the few attempts with **Mycoplasma** and the suspected bacterial parents have been successful.

Thus a relationship between **Mycoplasma** which are known to occur in nature and the bacterial L-forms produced in the laboratory remains in doubt. However, the similarities and the potential importance of the organisms to health should stimulate more thought and experimentation.

Bacterial L-forms in vivo

The establishment of a relationship between bacterial L-forms and **Mycoplasma** to prove a role for the former in disease would be obviated if L-forms were shown to exist **in vivo.** For reasons already outlined, a stable bacterial L-form isolated from a clinical specimen, by definition, would be a **Mycoplasma.** The ideal experiment would be the production and reversion of L-forms from a pure culture of a pathogenic bacterium in a germ-free animal. The necessity for a germ-free animal is to eliminate the interference due to normal bacterial flora. Although this experiment has yet to be attempted, there are reports indicative of L-transformations and reversions **in vivo.** White mice, which carry **Mycoplasma** in their upper respiratory tract as part of the normal flora, succumb to diphtheroid infections following production of stress, as by injection with cortisone, while mice free of **Mycoplasma** do not. Organisms with the characteristics of L-forms were isolated from chickens and turkeys in several outbreaks of infectious synovitis. The organisms reverted to **Bacillus licheniformis** under certain conditions **in vitro** (Roberts, 1964). A selected group of patients with histories of chronic staphylococcal infections were treated with antibiotics. Following remission of the disease symptoms, blood cultures yielded L-forms which reverted under specified cultural conditions to staphylococci. Blood cultures from normal controls produced negative results (Godzeski et al., 1965). Mice, inoculated intraperitoneally with lethal doses of group A streptococci, yielded L-forms as well as streptococci from peritoneal exudate and heart blood at death. The streptococci produced, upon reversion of these L-forms, were not only of the same group [A] but also of the same type [14] as the inoculated bacterium (Mortimer, 1965).

Analysis of the Role of L-forms in Disease

An oft used criterion to distinguish L-forms from **Mycoplasma** and hence to minimize the clinical importance of L-forms is the nonpathogenicity of L-forms. A critical examination of current knowledge points out the fallacy of this argument.

The pathogenic properties of many bacteria are associated with their surface structures. For example, group A streptococci are pathogenic by virtue of the M protein, pneumococci by virtue of a capsule and many gram-negative pathogens by virtue of endotoxins. L-forms of such bacteria would not be expected to behave as pathogens since the cell wall and capsule have been lost. In the case of streptococcal L-forms, the absence of M protein is the rule rather than the exception (Sharp et al., 1957). On the other hand, bacteria which are pathogenic because of factors not associated with surface structures produce L-forms with pathogenic properties. Thus, L-forms of coagulase-positive staphylococci retain this property (Mattman et al., 1961); L-forms of **Vibrio** are pathogenic for mice (Tulase and Lavillaureix, 1954) and contain neuraminadase (Madoff et al., 1961); L-forms of **Clostridium tetani** produce the typical tetanus toxin (Rubio-Huertos and Gonzalez-Vazquez, 1960; Schiebel and Assandri, 1959). An exception is the loss of pathogenicity of **Cl. perfringens** upon L-transformation (Kawatomari, 1958). Pathogenicity among the **Mycoplasma** is the exception rather than the rule. Even those **Mycoplasma** which produce disease usually are not highly virulent and invasion is limited to epithelial cells.

The role of L-forms in disease would be more significant if virulent properties were suppressed. Both L-forms and **Mycoplasma** are adapted for survival in the host. (1) They reside inside host cells out of reach of many therapeutic agents. (2) They are completely refractory toward penicillin, a commonly used antibiotic. (3) Their lack of the external structure of bacteria affords them protection against the major antibodies produced by the host against the parent organisms. (4) They exert little

virulent action against the host permitting the establishment of a true parasitic state. (5) They can act as a stimulus for low level but continuous production of antibodies against antigens common to the parent bacterium. (6) They defy detection by routine laboratory techniques. Then, could not the L-forms be possible answers to the puzzling questions concerning epidemiological spread of disease, reservoirs of infection, latency of infection and sequelar disease. A proposed hypothetical case employing our knowledge of L-forms does not answer these questions but does provide a basis for further thought.

A host becomes infected with a pathogenic bacterium. He responds by mobilization of his defenses or he seeks clinical treatment. Antibody is produced, particularly against the surface structures of the bacterium. Antibiotics, which exert their action against bacterial cell wall synthesis or do not readily permeate into host cells, are administered. The bacterium reacts in an effort to survive by undergoing L-transformation. In this state the organism is unaffected by the major antibodies and by antibiotics inhibitory to cell wall synthesis. The organism migrates into host cells out of reach of many therapeutic agents. Instead of killing the host, the bacterium in its effort to survive has adjusted to a state of true parasitism. The L-form is not producing any outward ill effect on the host nor is it detectable by routine laboratory methods. In essence the host has become an undetected carrier of the bacterium.

During its residence in the host as the L-form, it continues to stimulate production of antibody at low levels, thereby maintaining the antibody producing cells of the host in a state of mobilization. In the event of a second exposure of the host to the same bacterium, a rapid antibody response would be elicited possibly resulting in an immune reaction deleterious to the host. Examples are acute glomerulonephritis and rheumatic fever following acute streptococcal infection. Antigens of the cytoplasmic membrane of group A streptococci possess similarities to the glomerulus of the kidney (Markowitz, et al., 1960). Antigens reacting with group A streptococcal antibody can be found in various areas of the heart of previously exposed mice (Kaplan, 1958). These antibodies produced in abundance as a result of reinfection could react with the glomerular and cardiac tissue resulting in the respective clinical diseases. Further evidence in support of this possible mechanism is the increase in complement-fixing antibody against streptococcal L-forms concomitantly or slightly before appearance of positive cultures for group A streptococci in periodic epidemics of acute respiratory disease in Naval recruits (Crawford, 1960). This antibody is found in a high proportion of patients with acute rheumatic fever, declining during treatment and convalescence. Hence, sequelar diseases might be explainable in terms of L-forms.

Subjection of the host to stress with the resultant decrease in self-protective capacity could result in reversion of the L-forms to the original virulent bacterium, as in the cited example of mice treated with cortisone. In this event, L-forms could offer an explanation for latency of bacterial infections with epidemiological implications.

It should be made clear that no proof is available for the occurrence of these events. Nevertheless, the known facts about L-forms and their possible relation to **Mycoplasma** should be an impetus for their consideration in the search for solutions to the problems of infectious diseases.

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Cytological Basis of Carcinogenesis*

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The production of cancer by the action of foreign substances has been known since 1775 when Percival Pott noted in "Chirurgical Observations" the prevalence of scrotal carcinoma in chimney sweeps, caused by exposure to soot. Following this lead, Cook **et al.**[1] isolated from coal tar its major carcinogen, 3,4-benzpyrene (see Fig. 1). This led to the broad study of polycyclic hydrocarbons as skin carcinogens for mice, of which 1, 2, 5, 6-dibenzanthracene[2] is a good representative, and 20-methyl-cholanthrene[3] a very active carcinogen showing some structural relationship to the carcinogenic estrogens. In the case of the many related hydrocarbons which are carcinogenic for skin and lung, it has been shown that they all show:

1. Chemical reactivity in the K region[4] rather than in the usual L region, and are detoxified by oxidation in the M region.
2. Firm binding by skin proteins[5] and nucleoproteins.[6]
3. Capacity to bind -SH groups.[7] (Supplying extra -SH groups by BAL can inhibit carcinogenesis).
4. Ability to increase and alter skin lipids and decrease calcium, iron and copper in skin.[8]
5. Flatness and proper dimension, not too large or small, indicating necessity of fitting some dimension in tissues. The presence of these materials in tobacco smoke, automobile exhausts, coal smoke and industrial plant smokes presents a severe health problem.

Artificial coloring materials have been shown to be carcinogenic. Kinosita[10] demonstrated the production of hepatomas in rats following prolonged administration of butter yellow (4-dimethyl-aminoazobenzene) when the diet was limited to polished rice and was deficient in riboflavin. The specific binding of this carcinogen to liver protein[11] in the rat is again an indication that modification of tissue protein is a factor in carcinogenesis.

The halogenated aliphatic hydrocarbons are severe hepatotoxins, massive single doses producing hepatic necrosis. When, however, small divided doses of carbontetrachloride are administered to mice, a high incidence of hepatomas[12] occurs. The repeated minor damage and hyperplasia with regeneration and recovery evidently leads to hepatoma. These materials are effective paint removers, but are particularly hazardous when used indoors and inhaled.

Beta-naphthylamine has long been suspected as the cause of the high incidence of bladder carcinoma and has been demonstrated to be an active carcinogen for mice,[13] apparently being converted to the ortho-hydroxy or N-hydroxy derivative before demonstrating its activity. Many other aniline dye intermediates, particularly benzidine, are carcinogenic and represent a severe hazard in the chemical industry.

Ethyl urethane, formerly used as an anesthetic, has the capacity of inducing lung tumors in mice when administered orally or intraperitoneally in subanesthetic doses to mice[14] or rats.[15] The compound is also radiomimetic, causing mitotic arrest,[16] and showing some therapeutic value in the treatment of chronic myeloid leukemia.[17]

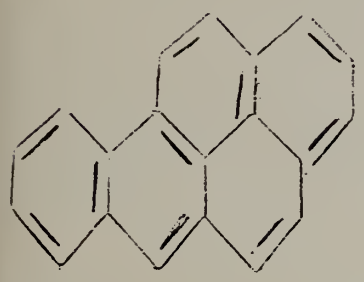
A wide variety of cross-linking agents, some of which are used to improve the properties of natural textile fibers such as wool, have been demonstrated to have carcinogenic activity. The nitrogen mustards, such as methyldi-(2-chloroethyl)-amine, were early shown[18] to be carcinogenic, their activity being due to re-

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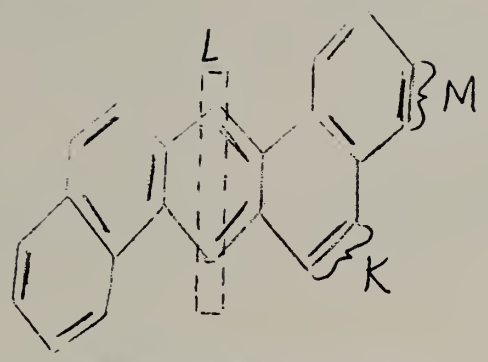
*Presented at the University of South Dakota postgraduate medical program "Cellular Response in Health and Disease," November 12-13, 1965.

**Department of Biochemistry, University of South Dakota Medical School.

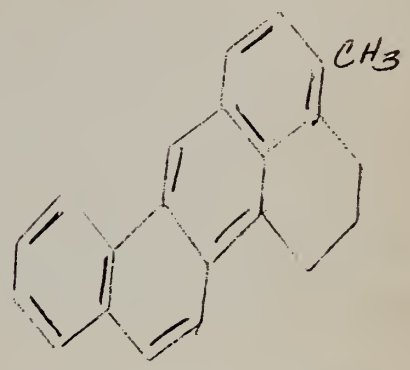
Plate I. Structures of Carcinogens



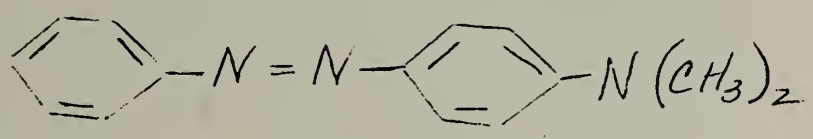
3, 4-benzpyrene



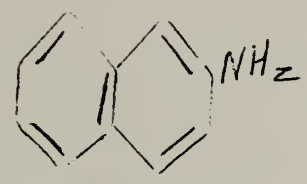
1, 2, 5, 6-Dibenzanthracene



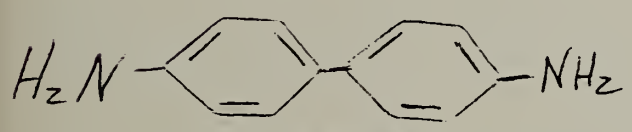
20-Methylcholanthrene



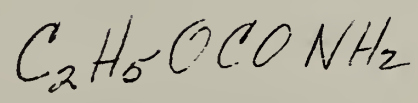
Dimethylaminoazobenzene
(Butter Yellow)



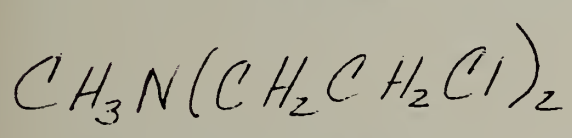
beta-naphthylamine



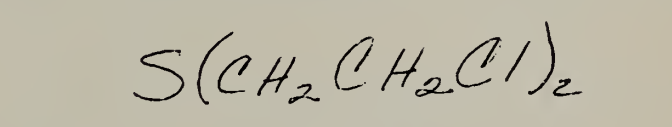
benzidine



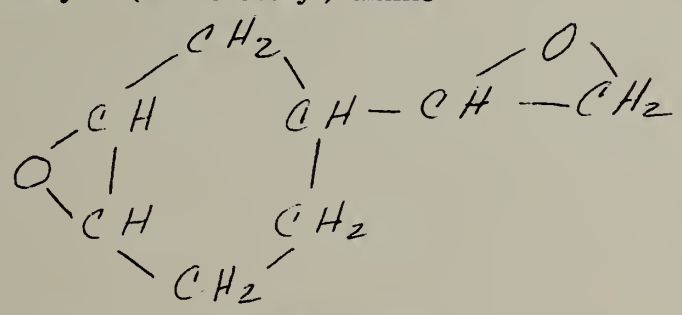
ethyl urethane



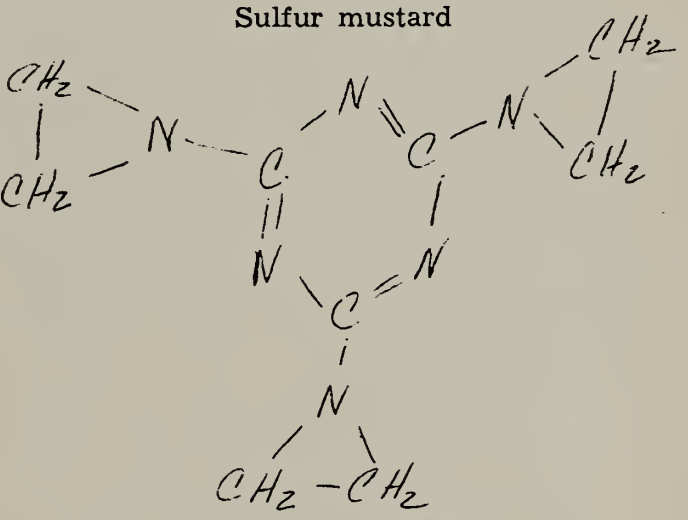
methyldi (2-chloroethyl) amine



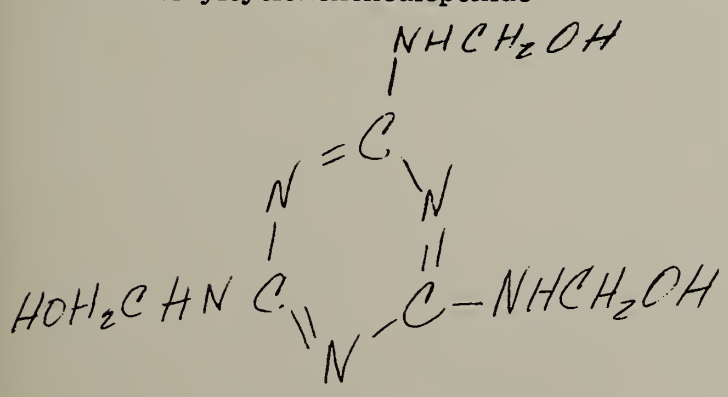
Sulfur mustard



4-vinylcyclohexenediepoxide



triethyleneimine-1, 3, 5-triazine



Trimethylolmelamine

action of the chlorine with the hydrogen on the -NH group in a protein chain, binding the alkyl groups to the nitrogens of two adjacent polypeptide chains.[19] Ford[20] demonstrated production of breaks in chromosomes of root tips of **Vicia faba** prior to the onset of prophase whereas X-irradiation produces the change at prophase. The substance is radiomimetic and has shown some value in the chemotherapy of leukemia, similar to ethyl urethane. Other cross-linking agents act similarly (sulfur mustard,[21] epoxides,[22] ethyleneimines,[23] trimethylol mel-

amine.[24] These crosslinking agents produce their carcinogenic effects by modifying the proteins and nucleic acids of the normal cell, producing abnormal proteins and nucleic acids which serve as the basis of abnormal cells. It is interesting to note that these substances are all radiomimetic and all show curative effects as well as carcinogenic effects, modification of the proteins and nucleic acids in the cancerous cells serving to limit their growth.

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Phenylketonuria in Relation To Mental Disease*

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Phenylketonuria (PKU) has been known since 1934 when it was first described by Folling.[1] The work of Jervis[2, 3, 4, 5] demonstrated that the disease was inherited through a single autosomal recessive gene, and that the metabolic error was the inability to convert phenylalanine to tyrosine because the liver phenylalanine hydroxylase was inactive in these people. A treatment was then developed which consisted of a low phenylalanine diet.[6, 7] Varying success has been achieved with a low phenylalanine diet, but all studies indicate the earlier the treatment is begun, the better are the results obtained. Recent comprehensive reviews of phenylketonuria[8, 9] have examined in detail and integrated the several hundred papers published on this subject. The purpose of the present paper is to point out some interesting aspects of phenylketonuria from the clinical and basic biochemical findings which may relate to the mental retardation in phenylketonuria and to mental disease in general.

The basic error in phenylketonuria seems to be the absence of the liver enzyme phenylalanine hydroxylase. (There is the possibility that an inactive form of the enzyme is produced.) The work by Kaufman[10, 11] elucidated the mechanism of the liver phenylalanine hydroxylase, which consists of two enzyme portions and a pteridine cofactor. Phenylalanine, in the presence of phenylalanine hydroxylase, oxygen, and a pteridine cofactor, is converted to tyrosine. In the process the pteridine cofactor is oxidized and must be reduced in order to be used again. The reduction of the cofactor requires a second enzyme and reduced nicotinamide adenine dinucleotide phosphate. The question then arose whether the cofactor or the second enzyme was missing from phenylketonuric patients. This question was answered by a series of experiments reported by Kaufman.[12] It was clearly demonstrated that livers from phenylketonurics had the pteridine cofactor, but lacked phenylalanine hydroxylase. It should be mentioned that apparently phenylalanine hydroxylase occurs only in the liver, and appears only after the biochemical differentiation following birth.[13] This implies that phenylketonurics are normal at birth and that differentiation and the adverse effects take place later.

Phenylketonuria is estimated to have an incidence of 1 in 25,000 among populations stemming from western and northern European countries. However, when it has been sought it has been found in other races including Yemenite Jews[14] and Japanese.[15] It is estimated that phenylketonurics are 1% of the institutionalized mentally defective individuals. The striking thing is that almost all untreated phenylketonurics have severe mental retardation with 90% having an I.Q. of less than 50, and 60% with an I.Q. of less than 20. However, with treatment begun under 3 years of age this picture is greatly improved,[9] particularly with the number having I.Q.'s above 60. There is a highly significant correlation between age of beginning of treatment and I.Q. Although it is a matter of concern, not enough data have been accumulated to date to indicate whether treated PKU's and heterozygotes will have a higher incidence of mental illness.

Phenylketonuria represents a case where a known biochemical disorder has been correlated with a mental disease. It has thus provided the impetus to look for other biochemical disorders in mental disease. The exact biochemical cause for mental retardation in PKU is not known, but the deficiency of brain cerebroside[16, 17] seems to be the basis for defective

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myelination which is found in PKU. Some clinical findings are interesting in view of recent experimental results. Phenylalanine in plasma of normal individuals is 0.078 umol/ml., 0.103 umole/ml. in heterozygotes, and 1.78 umole/ml. in PKU[9] by enzymatic assay. Serum 5-hydroxytryptamine levels in other mental defectives was found to be 270 mg/ml. while in PKU it was 57 mg/ml.[18] Epinephrine is evidently lower than normal in the plasma of all mental defectives.[19] Urine values for 5-hydroxyindoleacetic acid are 2.2 mg/gm. creatinine in PKU and 4.9 mg/gm. creatinine in other mental defectives.[18] Urinary values for excretion of indolepyruvic acid are about .14 gm. per day in PKU while normals are about .04 gm. per day.[20] Serum and urinary levels of other metabolites are also altered in PKU; however, the above values were cited because 5-hydroxytryptamine (serotonin) is often implicated in mental function. Since serum levels of serotonin are lower, it follows that the urinary metabolite 5-hydroxyindoleacetic acid is also lower in PKU. The non-hydroxylated metabolite of tryptophan, indolepyruvic acid, is elevated in urine of PKU individuals. These clinical findings indicate an impairment of serotonin production by the high levels of phenylalanine found in PKU. Brain serotonin levels were decreased in rats fed a diet rich in phenylalanine, and they scored lower in a maze test than did controls.[21] The authors did not find a causal relationship between these findings, and they thought the decreased central serotonin was an auxiliary phenomenon to a number of altered metabolic processes. In another study of rats made phenylketonuric by high phenylalanine diets, marked reduction of brain serotonin was found.[22] The workers had evidence this was caused by high levels of phenylalanine inhibiting the active transport of the precursor of serotonin, 5-hydroxytryptophan, into brain. This would be important if brain did not hydroxylate tryptophan; nevertheless, there is one other complicating factor. It was shown[23, 24] that liver possessed the ability to hydroxylate tryptophan and that the enzyme catalyzing this reaction was liver phenylalanine hydroxylase. If this is an important source of 5-hydroxytryptophan, then in PKU where the enzyme activity for hydroxylating phenylalanine is absent, the source of 5-hydroxytryptophan could be greatly altered. Recently, it has been demonstrated that although brain can hydroxylate tryptophan and synthesize serotonin independently,[25, 26] further studies indicated that the brain could not synthesize all the 5-hydroxytryptophan it uses and must rely on other sources for most of its supply.[27] Also it was estimated that liver phenylalanine hydroxylase could hydroxylate enough tryptophan for the brain's need. This would give added significance to loss of liver enzyme activity in PKU.

There is also the possibility that high levels of phenylalanine and its metabolites found in PKU may inhibit other enzyme systems. For instance, it has been shown[28] that brain tyrosine hydroxylase, which is the first step in the conversion of tyrosine to norepinephrine, can be inhibited **in vitro** by 10^{-4} M phenylalanine, which is in the range of the levels found in serum of PKU individuals. In another study it was found experimentally that high levels of serum phenylalanine can cause an imbalance of free amino acids found in brain.[29]

The primary lesion in phenylketonuria, the loss of liver phenylalanine hydroxylase activity, is of great importance. From the selected examples it can be seen that an imbalance of nutrients can result which can be detrimental to the developing brain. Secondarily this can cause an inhibition of active transport of amino acids or the inhibition of specific reactions involved in the synthesis of biologically important compounds. Phenylketonuria does afford the possibility of studying a mental defect caused by a specific biochemical lesion, and hopefully insight can be gained into the cause and treatment of other severe mental illnesses.

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Cellular Action of Cardiac Glycosides*†

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The use of the purple foxglove as a drug dates back to the Welsh physicians of the 13th century, when it was used as a purge or emetic. In 1542 it was given the botanical name **Digitalis Purpurea.**

The modern use of the purple foxglove is derived from the classical observations of William Withering[1] published in 1785. Withering's original directions for the use of digitalis were exacting and are followed to some extent today.

> "Let the medicine be continued until it acts on the kidneys, the stomach, the pulse, or the bowels; let it be stopped upon the first appearance of any one of these effects."

While there are numerous cardiac glycosides, the basic active structure consists of a steroid nucleus with one or more sugar molecules attached. The steroid nucleus or genin is the active portion of the glycoside. The genin, however, must have a specific structure to display this activity; a hydroxyl group at carbon-3, a 14B-hydroxyl group, and an unsaturated lactone ring.[2] The sugar molecule influences the solubility, binding power, and protects the glycoside from inactivation.[3]

One of the great problems in congestive heart failure, is the inability to demonstrate any physiological or pathological changes in the heart muscle. One can demonstrate pressure and flow abnormalities, however, which can be attributed to a decreased cardiac output resulting from an incomplete ventricular emptying. This then leads to an increased initial length or tension. The cause of incomplete ventricular emptying resulting from a decreased strength of contraction remains the unsolved question.

Numerous theories have been developed to account for this failure of the myocardium. The oldest and perhaps the most widely accepted theory is that proposed by Frank[4] and Starling.[5] These authors have shown that the contractile energy of the heart is a function of the initial length of the myocardial fiber. If the fiber was stretched beyond a critical length, the contractile energy diminished resulting in a weakened force of contraction which could result in congestive failure. Linzbach[6] has suggested that cardiac insufficiency results, not from overstretching of the fibers or inadequate oxygen consumption per fiber length, but from strictly mechanical reasons. Welty[7] has suggested the formation of an improper contractile protein as a result of increased stress. Clarke and Moscher[8] explain the reduced myocardial contractility in terms of an alteration in the intracellular ionic environment. In patients dying of congestive heart failure there is an elevated myocardial intracellular sodium content and lowered myocardial intracellular potassium content.[9, 10] The elevated sodium content leads to an inhibition of the contractile apparatus, while lowered potassium leads to irregularities in membrane excitation. These authors suggest that the lowering of the elevated sodium content then leads to an increased contractility. Niedergerke and Harris[11] have shown, however, that a decrease in sodium leads to an increase in myocardial calcium. The role of calcium in congestive heart failure should be considered because of its dominant role in muscle contraction. Kapeller and Kutschera-Aichenbergen[12] have reported a decreased calcium content in hearts in congestive failure. The greatest calcium decrease was on the side bearing the greater work load.

Many earlier workers suggested that myocardial failure resulted from metabolic defects or anoxia. In more recent studies myocardial metabolism and oxygen consumption would appear to be normal. In fact, Rossi and Dianyani[13] found that the high energy phosphate content was normal and could demonstrate no defect in oxidative phosphorylation.

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Wollenberger[14] has suggested that the inability of the heart to pump the entire volume of blood presented to it is a result of the failure of the contractile elements to translate the energy available from metabolism into kinetic energy of contraction.

Clinically the administration of digitalis in this condition of low output congestive failure leads to: (a) a greater degree of ventricular emptying, (b) a greater force of contraction and (c) a correction of the sodium-potassium electrolyte imbalance.

It has been suggested that the localization of the cardiac glycosides within the myocardium may offer some clue as to their mechanism as well as their site of action. It has been shown[15] that there is a uniform uptake of ouabain-H^3 in the contractile cells of the myocardium with much less uptake in the Purkinje cells. The Purkinje cells, however, are much more sensitive to toxic concentrations of glycosides than are the contractile cells.[16] While autoradiography of labeled glycosides has been difficult in myocardial tissue slices, initial reports[17] suggest that the glycosides may be located in certain areas of the cells; around the cell membrane,[18, 19] inside the cell associated with the A bands of the myocardial sarcomere[19, 20, 21] [which represents the myosin component of the contractile element], and in the sarcotubular system.[22] While the concentration of a cardiac glycoside at a specific subcellular site does not necessarily prove that the substance acts at that site, it is tempting to define a role for the cellular action of digitalis on the basis of this localization; 1) a direct effect on the contractile elements, 2) an effect on excitation-contraction coupling, and 3) an effect on the electrolyte environment within the cell.

Tubbs, Crevasse and Wheat[23] localized tritiated digoxin within the dog myocardium by utilizing the combined techniques of electron microscopy and autoradiography. These authors found that about 70 per cent of the total glycoside uptake was localized within the sarcomere and that some 75 per cent of this activity resided within the A band of the sarcomere. These findings have been confirmed by Conrad and Baxter[19] and Fozzard and Smith.[22] Schaer[24] has shown by equilibrium dialysis that cardiac glycosides actually bind to purified myosin in a molecular ratio of 1:1. Waser[25] also has demonstrated that the formation of this complex leads to an increased binding power of myosin for both potassium and calcium. It is interesting to note the chemical similarity between the active sites on the cardiac genin proposed by Brown, Stafford and Wright[2] and the active sites on myosin proposed by Weber[26] for the interaction between actin and myosin in contraction. While much has been reported concerning whether the cardiac glycosides do or do not initiate contraction in the absence of calcium ions,[27] it is well established that calcium enhances the increased contractile force with digitalis.[28] Kako and Bing[29] have shown that the contractility of actomyosin bands prepared from failing human hearts can be restored to normal in the presence of digoxin and ionized calcium. Some of the conflicting reports in the literature may be clarified by the work of Lee[30] in which he demonstrated that the "relaxing factor" of Marsh[31] must be present for ouabain to exert an enhanced contractility. The role of calcium in the contractile mechanism is far from clear, however, it is thought to act by either establishing or strengthening the cross links between the filaments (actin and myosin) or by increasing the ATPase activity of myosin thereby enhancing the probability of interaction.[32]

In the search for the link in excitation-contraction coupling, Bennett[33] along with others have rediscovered the sarcoplasmic reticulum. Huxley and Taylor[34] and Huxley[35] have been largely responsible for directing attention to this structure due to their work with skeletal muscle showing that a critical area exists over the sarcomere where only an inwardly directed stimulus can be conducted. This critical area correlates well in cardiac muscle with the vesicular structures of the sarcoplasmic reticulum called triads.[36, 37] Hasselbach and Makinose[38, 39] have described a calcium pump associated with this reticular fraction. Simultaneous with the pumping or storage of calcium there is an increased splitting of ATP (adenosinetriphosphate). It has been well established that calcium is the only physiological ion which when injected in low concentrations produces contraction of muscle.[40] It has been further established that membrane depolarization promotes the entrance of calcium into the cell[41] and that an increased calcium entry leads to a prolonged contractile state.[42] Klaus[43] has demonstrated a linear relationship between the increased calcium uptake and potentiation of the twitch amplitude. It has been repeatedly shown that the positive inotropic effect of the cardiac glycosides is associated with increased calcium exchange in cardiac tissue.[44] Some investigators have found

that the action potential is prolonged in the initial stage of glycoside action.[45, 46] Holland and Sekul[47] along with others have shown that ouabain increases the influx of calcium[45] in isolated rhythmically contracting atria. In the hypodynamic heart it would appear that at least a portion of the positive inotropic action of the cardiac glycosides can be related to an increased availability of calcium in providing a sustained link between excitation and contraction.

While it is difficult to separate the effects of electrolytes on contraction it would appear that the digitalis glycosides may play a role in the maintenance of an electrolyte environment favorable for optimal contraction.

Hajdu and Leonard[48] put forth a suggestion in 1959 that the "therapeutic" effect of digitalis is related to the lowered intracellular potassium content. This work is questioned somewhat in the light of more recent findings. Koch-Weser and Blinks[49] have demonstrated that cardiac glycosides in concentrations producing a positive inotropic effect need not cause a net loss of potassium from the heart. These authors have shown that the loss of intracellular potassium is not associated with a positive inotropic effect. Vick[50] in addition has shown that loss of potassium from the myocardium does not lead to augmentation of contractile force, since several lactones which cause a loss of intracellular potassium have a negative inotropic effect. Recent studies[51] have suggested that the lowering of intracellular potassium is a "toxic" manifestation rather than a "therapeutic" effect. While it is difficult to state what constitutes a "toxic" dose of a drug in an isolated system, recent findings would suggest that a glycoside concentration of 10^{-6} M would appear to be an acceptable dividing line. Numerous authors have demonstrated an increase in myocardial intracellular potassium with therapeutic concentrations (10^{-6} M or less) of digitalis glycosides; Hagen[52] using intact hearts, Brown et al.[53] using dog heart lung preparations, Klaus et al.[54] using guinea pig auricles, and Welty and Read[55] using incubated dog heart tissue slices.

The adaptation of Skou's[56] Na+-K+-activated-ATPase system to heart tissue has shed further light on this question. Portius and Repke[57] using this system have shown that low glycoside (10^{-10}-10^{-7} M) concentrations stimulated the ATPase activity while high (10^{-6}) concentration inhibited activity. This has been confirmed by Yu and Lee[58] and Welty and Raszkowski.[59] Fawaz[51] has concluded that glycoside doses which inhibit the Na+-K+-activated-ATPase system are also cardiotoxic. The fact that digitalis intoxication can best be combatted by potassium administration and the observation that digitalis inhibition of the Na+-K+-activated-ATPase can be reversed by raising the extracellular potassium concentration would appear to support this conclusion. In addition, the clinical observations that therapeutic doses of digitalis increase the myocardial intracellular potassium and lower myocardial intracellular sodium are consistent with these results.

In the treatment of low output congestive heart failure there is no doubt that digitalis improves the mechanical efficiency of the heart. While the basic cellular mechanism of action of the glycosides is not clear, certain facts have been brought to light. The subcellular localization of the cardiac glycosides in addition to more concrete experimental evidence have suggested possible areas of action. It would seem that the cardiac glycosides may act at the specific areas discussed, however, the common mediator of the inotropic action would appear to be calcium. Whether digitalis inhibits a "relaxing factor" by mobilization of calcium ion present, or by increasing the influx of calcium, or by binding calcium to the contractile apparatus would lead to the same end result. This calcium mobilization theory is finding much greater acceptance, however, we must await further direct evidence before reaching a final decision.

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Some Disorders of Amino Acid Metabolism in Man*

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It is probable that virtually all human disease involves some alteration of amino acid metabolism; many human diseases are genetically determined and therefore reflect the translation of genetic information into abnormalities of protein synthesis.

Shortly before the turn of the present century Sir Archibald Garrod began his studies on alcaptonuria which were to culminate in his classic Croonian Lectures of 1908[1] and in his monograph on "inborn errors of metabolism" which appeared in 1909 and again in 1923.[2] Garrod had observed a series of patients with alcaptonuria[3] and had noted that they excreted large quantities of homogentisic acid, whereas other persons excreted none at all. On conferring with Bateson, one of the early British geneticists, Garrod learned that the situation was readily explained in terms of the recently rediscovered laws of Mendel.[4] Following similar observations on cystinuria, albinism, and pentosuria, Garrod developed the concept that certain diseases of lifelong duration arise because an enzyme covering a single metabolic step is reduced in activity or missing altogether. Garrod viewed the accumulation of homogentisic acid in alcaptonuria as evidence that this substance is a normal metabolite in the dissimulation of tyrosine and correctly attributed its accumulation to a failure of oxidation of homogentisic acid. A half century later Garrod's hypothesis was proved by the demonstration of the absence of homogentisic acid oxidase activity in the liver of a patient with alcaptonuria.[5]

Similarly, the failure of pigment formation in the skin in albinism, the appearance of pentose in the urine in essential pentosuria, and the excretion of large amounts of cystine in the urine in cystinuria were viewed by Garrod as the results of blocks in normal metabolic pathways. He attributed the first instance to failure of melanin formation and the other two to excretion of metabolites accumulating proximal to the block in metabolism. His interpretation of the defect of cystinuria has required modification, but the correctness of his remaining hypothesis has been supported by subsequent studies.

The transmission of a single character as a governing agent for a single enzyme is a thesis which is implicit in Garrod's writings, but it was never stated as such. The term gene was not introduced until three years after Garrod's Croonian Lecture, and nearly 40 years more were to pass before Beadle[6] clearly formulated the "one gene-one enzyme" concept. This latter concept has been well expressed by Tatum[2] as follows:

1. All biochemical processes in all organisms are under genetic control.
2. These biochemical processes are resolvable into series of individual step wise reactions.
3. Each biochemical reaction is under the ultimate control of a different single gene.
4. The mutation of a single gene results only in an alteration in the ability of the cell to carry out a single primary chemical reaction.

It is of considerable interest that certain enzymatic deficiencies affect a wide variety of tissues, **i.e.,** total albinism and galactosemia, while other defects appear to be restricted to a particular organ or tissue. It is noteworthy that a very large number of the inborn errors of amino acid metabolism are associated with defects in central nervous system function. The findings suggest that normal cerebral function is crucially dependent upon a favorable tissue environment. The studies on phenylketonuria and galactosemia suggest that if such environmental factors can be controlled during the period of brain development, normal function will be possible. Although many metabolic

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pathways are now understood, it is apparent that our knowledge of metabolism is far from complete. The likelihood that a large portion of all human disease is associated with qualitative or quantitative changes in the cellular enzymatic machinery amply justifies further research. The following will be a brief summary of some of the metabolic disorders involving amino acid metabolism.

PROLINEMIA

Studies have been carried out on several patients with this inborn condition in which the plasma proline concentration ranges from 6 to 20 times that of the normal value. These patients excrete proline, hydroxyproline and glycine in the urine. A convulsive syndrome has been observed in patients possessing apparently normal concentrations of amino acids in the blood plasma; however proline, hydroxyproline and glycine are excreted in the urine.

MAPLE SYRUP URINE DISEASE

Menkes **et al.**[8] reported observations on four infants in the same family who exhibited severe central nervous system symptoms and excreted urine that possessed an odor similar to that of maple syrup. Later found was a somewhat older mentally retarded infant with similar symptoms and findings and subsequently a number of other cases of maple syrup urine disease were reported. The symptoms which are generally seen early in life include convulsions, mental retardation, respiratory distress and feeding difficulties. Many such patients die within a few months of birth; however, older patients have been observed whose principal difficulty is mental retardation. The blood plasma concentrations of valine, leucine, and isoleucine are greatly elevated in this disorder. The alpha-keto analogs of these amino acids have been found in the blood plasma and urine and there is evidence also for the occurrence of the corresponding alpha-hydroxy acids. The enzymatic block appears to be that the alpha-keto analogs of the branched chain amino acids are unable to be oxidatively decarboxylated. Conversion of the alpha-keto acids to the corresponding alpha-hydroxy acids is probably a side reaction catalyzed by lactic acid dehydrogenase. It is difficult to explain the maple syrup odor of these patients. Some impure preparations of the branched chain amino acids exhibit an odor which resembles that of certain samples of maple sugar. Postmortem studies have revealed a number of pathological changes in the central nervous system.

CYSTATHIONINURIA

It is well known that homocysteine and serine combine in the body to form cystathionine. Harris **et al.**[9] has described a 64 year old female imbecile who excreted about 0.5 gram of cystathionine per day in the urine. Feeding methionine increased the excretion of cystathionine, and cystathioninuria of lesser extent was found in two of the patient's relatives who did not exhibit clinical symptoms. Subsequently a 44 year old man with congenital defects and mental aberrations was found who excreted approximately 1 gram of cystathionine per day. Considerable amounts of cystathionine are present in the human brain and cerebral spinal cord suggesting that this compound may have a role in cerebral function. The possibility that this condition is associated with hereditary deficiency of cystathionase must be considered, but as yet no direct enzymatic investigations have been carried out and the relationship of cystathionine to cerebral function requires further study.

HOMOCYSTINURIA

Carson **et al.**,[10] had described this condition in two sisters that had exhibited convulsive signs and mental retardation. These patients showed increased blood concentration of homocystine and methionine. The chemical findings are consistent with the complete or nearly complete absence of cystathionine synthetase. For such patients, cystine or cyteine must be considered as an essential dietary amino acid. It is of interest that only a small fraction of dietary methionine is excreted as homocystine in this disorder suggesting that larger and normal amounts of methionine are metabolized by alternate pathways. The mechanisms responsible for the chemical findings are not yet clear; however, it seems likely that cystathionine is essential for a normal brain function. The possibility that other metabolites of methionine are produced in toxic quantities must be also considered.

HARTNUP DISEASE

A condition known as H disease (Hartnup Disease) or Hart's syndrome was first described by Baron[11] who observed a family, some of whose members exhibited pellagra-like skin rashes and aminoaciduria. Several of these individuals indicated psychiatric disturbances as well as the characteristic skin condition. Clinical findings suggested an abnormality of tryptophan. It appears probable that the disease is associated with a defect of amino acid transport both in the renal tubules and in the intestine.

HISTIDINEMIA

In 1961 it was reported that histidinemia and histidinuria occurred in two sisters, the youngest of which exhibited a speech defect. Studies showed that the enzymatic defect in this condition was due to the absence of the enzyme histidase. The sweat and skin of patients with this disorder did not contain urocanic acid, in contrast to normal controls. The blood plasma histidine concentration in patients with this disease may be as much as 15 times the normal value. It is of interest that many of the patients with histidinemia exhibit impairment of speech. Speech is said to be not completely intelligible and there are defects in articulation and retardation in the development of language skills. The relationship between histidine metabolism and the symptomatology is not clear.

Some of these diseases lend themselves unusually well to the ingenious employment of therapeutic maneuvers and often the results are especially gratifying. In many conditions, however, there is little hope of development of specific therapy. The type of approach varies with the nature of the defect and the means available to overcome it.

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Copper Metabolism in Wilson's Disease*

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Wilson's Disease was first described as a separate entity by Kinnier Wilson in 1912.[1] The disease involves primarily the putamen. Since the putamen is a part of the lenticular nucleus, Wilson described the disease as Progressive Lenticular Degeneration. This name has since been lengthened to Progressive Hepatolenticular Degeneration to indicate that the liver is involved. Within the past decade it has become evident that the kidney is also involved late in the course of the disease.

The lenticular nucleus has the size and shape of a Brazil nut,[2] and is divided by a vertical plate of white matter, the external medullary lamina, into an outer part, the putamen, and an inner part, the globus pallidus. The putamen receives afferent fibers from the motor and premotor cortex, the substantia nigra, and various thalamic nuclei. Efferent fibers from the putamen pass mainly to the globus pallidus, however, some pass to the substantia nigra. The functions of the putamen have not been described thoroughly as yet, but some understanding of the functions can be ascertained by noting the nervous connections just described as well as the neurologic symptoms observed in Wilson's Disease. These include dysarthria, dysphagia and contracture leading to dystonic rigidity and rhythmic tremors. One outstanding symptom of the disease appears not to have been observed by Wilson. This is the well known Kayser-Fleischer ring seen in over 90 per cent of the cases of Wilson's Disease. It is a brown or greyish-green ring at the limbus of the cornea. The absence of a ring does not exclude Wilson's Disease, but does make diagnosis of the disease highly improbable. The majority of cases of Wilson's Disease become clinically detectable between the ages of 12-20 years. If symptoms of the disease appear during childhood, it usually is an acute type with rapid progression to death in one to four years (if untreated). However, if it first makes its appearance during adult life, it is more often a chronic type of illness with only slow progression of the disease (five to ten years). Patients usually fall into two general groups with many gradations between the two groups. In one the symptoms are mainly neurological, while in the other, the symptoms are primarily those of hepatic cirrhosis. The neurologic form of the disease is seen most frequently.[3] Regardless of the organ primarily involved the disease is very rare. In a recent nine year period Mayo Clinic diagnosed only 16 cases of Wilson's Disease.[4]

A comprehensive study of the mode of inheritance was reported by Bearn[5] covering twenty-six cases of the disease distributed in sixteen families. A preliminary study revealed the parents of afflicted children demonstrated no clinical or biochemical abnormality. The simplest explanation would be that the disease is inherited from parents who are heterozygous for the abnormal allele, but who are phenotypically normal. Since the chance for a heterozygote to meet the same abnormal gene in the general population is equal to the gene frequency (with random mating) while the chance for a first cousin to have the same abnormal gene is one in eight, it is of importance to know the incidence of consanguinity in affected families. As suspected, Bearn found the incidence of first cousin marriages in his group of patients was over 30 per cent. If marriage between second and third cousins was included the total consanguinity rate was over 60 per cent. Bearn attempted to compute the gene frequency, although his data is complicated by the fact that the incidence of cousin marriage in the general population is uncertain. This study yielded a gene frequency of one in 2,000 and, with random mating, a disease incidence of one in 4,000,000. Thus, in a city the size of New York you would expect to find only two cases of Wilson's Disease. This portion of Bearn's study included 26 cases and doubtless he did not find all such cases in the city. This does not suggest his calculations are in error, rather, a difference of this magnitude suggests he is studying "isolates." These are sub-groups in the general population with a higher degree of

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intermarriage than the general population. This theory is supported by investigation of the racial characteristics of his patients. Italians comprise 31 per cent of his group while 50 per cent were Jewish. These are populations generally conceded to have a high incidence of intermarriage. It should be pointed out that the disease is not restricted to the above two racial groups, nor does it predominate in either of the two sexes. Bearn considers it almost certain that the disease is caused by the inheritance of recessive genes from heterozygous parents.

Copper metabolism has been known to be abnormal in Wilson's Disease for several years. Haurowitz[6] in 1930 reported that the copper content of the liver and basal ganglia were elevated in two cases of Wilson's Disease. Glazebrook[7] found that the direct-reacting copper (albumin-bound copper) of the serum was elevated in this condition. Cumings[8] extended these observations to more tissues and found copper accumulation had occurred in liver, white and grey matter of the cerebral cortex, the putamen, and globus pallidus. Copper accumulation of like magnitude was not observed in jaundice or cirrhosis of the liver. The copper content of cirrhotic hepatic tissue may be above normal, but not increased to the level seen in Wilson's Disease. Cartwright et al.,[9] studied the copper content of a wide variety of tissues from patients with Wilson's Disease and found essentially the same results. Tissues examined included cardiac and skeletal muscle, lung, erythrocytes, liver, spleen, kidney, adrenal gland, pancreas, spinal cord, white and grey matter of cortical tissue and cerebellum, basal ganglia and brain stem. They found abnormally high copper contents in all of these tissues except cardiac and skeletal muscle, lung tissue and erythrocytes. The characteristic Kayser-Fleischer rings seen in Wilson's Disease are due to the copper content.

Evidence was available in the literature suggesting that copper absorption was increased with Wilson's Disease, but the evidence was far from conclusive.[9, 10, 11, 12] Bush, et al.,[13] made an extensive study of comparative absorption and excretion of CU^{64} in normal individuals and those with Wilson's Disease. They noted a reduced fecal excretion of such copper after either oral or intravenous administration in patients. This was not due to decreased biliary excretion since prior investigation had revealed normal copper levels in bile during Wilson's Disease.[14] In addition, their calculations indicated there is a considerable increase in copper absorption associated with Wilson's Disease. Normal individuals absorbed an average of 32 per cent of an administered dose of copper, while those with Wilson's Disease absorbed 49 per cent. It had been contended by Bush, et al, that copper absorption might be directly related to the ceruloplasmin level. Their contention was not supported by these results. In their four subjects with Wilson's Disease it was found that the individual with the highest ceruloplasmin level absorbed the greatest percentage of the administered dose of radiocopper.

The early investigators in this area did not realize other organs might be damaged by the accumulation of copper. The earliest indication of possible renal involvement in Wilson's Disease was the finding that there was increased excretion of amino acids (single patient).[3] This was followed by the report of Mandelbrote, et al.,[15] who found an increased excretion of copper. Bearn[16] made a most comprehensive study of renal function in Wilson's Disease in 1957. This study included measurements of GFR, RPF, Tm, HCO_3 reabsorption, excretion of titratable acidity and excretion of amino acids. In brief, he found decreases in GFR, RPF, and Tm (PAH and glucose) in which the degree of impaired function was roughly correlated to the severity or duration of the disease. Also, in extremely advanced cases of Wilson's Disease, he found the urine to be alkaline, apparently due to decreased HCO_3 reabsorption. When amino aciduria accompanied the disease, specific amino acids seemed to be preferentially excreted. For example, the excretion of threonine and cystine was about 20 times above normal; while serine, glycine, asparagine, valine, tyrosine and lysine excretion were increased only 5-10 times above normal. Histidine, ornithine and phenylalanine excretion were increased only slightly, while traces of proline and citrulline were found. These last two are not normally present in urine. Also of interest; taurine, methylhistidine, aspartic acid, isoleucine and arginine were found in smaller amounts in the urine of patients than in normal subjects.

Bearn suggests the abnormal accumulation of copper in the renal tubular cells (in Wilson's Disease) may interfere with, and disrupt enzyme systems essential for the transport mechanisms. Some other divalent metal ions act in this manner.[17] He does not believe the kidney is the primary target in this disease, though a deformed proximal convoluted tubule associated with the disease has been des-

cribed.[16] This appears to have been either a local change due to Wilson's Disease, or an artifact, since other investigators have not noted such an abnormality.[18] Bearn[16] considers the first defect to occur in the proximal tubule as evidenced by the depressed Tm for PAH and glucose. Later, damage encompasses the rest of the nephron as shown by the decreased GFR and RPF. In the final stages of the disease there is excretion of an alkaline urine. This apparently indicates extensive renal damage. Bearn interprets this as indicating progressive deterioration of renal function associated with the accumulation of intracellular copper.

Thus, it had been demonstrated prior to 1950 that Wilson's Disease was associated with some abnormality in metabolism of copper. Since there is a relationship between copper metabolism and Wilson's Disease, several investigators have attempted to demonstrate a role for ceruloplasmin in regulating copper metabolism.

Ceruloplasmin was discovered and isolated from serum by Holmberg and Laurell in 1948.[19] They described it as protein in nature, light-blue in color and containing copper. The substance was found to have a molecular weight of 151,000 and contained 8 atoms of copper per molecule. This copper is apparently tightly bound to the ceruloplasmin molecule and accounts for almost 95 percent of the plasma copper, the remaining 5 per cent is more loosely combined with plasma albumin and may represent copper in transport. The normal concentration of ceruloplasmin is on the order of 30 mg per cent or about 0.5 per cent of the total plasma proteins. There may be a correlation between age and ceruloplasmin concentration since this protein is absent from the plasma of premature infants and increases progressively during the first two years of life.[20-22] Electrophoretically ceruloplasmin migrates with the α_2-globulins. End-group analysis has been performed on ceruloplasmin isolated from swine and phenylalanyl residues have been identified at both ends of the molecule.[23] An acid hydrolysate preparation of such ceruloplasmin yielded a glycooligopeptide containing arabinose, ribose and xylose as the sugars and the amino acids threonine, alanine, lysine and histidine. The sugar fraction was bound to the e-amino group of lysine. Ceruloplasmin has been shown to exert oxidase activity toward a variety of substances including paraphenylenediamine, benzidine,[24] serotonin,[25] epinephrine and dihydroxyphenylalanine (DOPA).[26] Even though a considerable body of information concerning ceruloplasmin accumulated in the literature nothing was known concerning its function until Scheinberg and Gitlin[27] studied the relationship between plasma ceruloplasmin concentration and Wilson's Disease. They found that in eight individuals with Wilson's Disease the ceruloplasmin was decreased to about 25 per cent of normal.

Since their initial report, the protein has been shown to be either absent or, if present it is present in very low concentration in more than 90 per cent of the patients with Wilson's Disease.[28] However, over a dozen patients with Wilson's Disease have been found that have normal ceruloplasmin levels.[29] These reports raised the question as to whether the decrease in ceruloplasmin (in over 90 per cent of the cases) was related to depressed synthesis or increased rate of destruction of the protein.

This type of problem can best be solved by the use of radioactive isotopes, unfortunately, radioactive copper^{64} has a half-life of only 12.88 hours which limits its use to rather short term experiments (4-5 days). Despite this shortcoming, Bearn attempted a study in 1955 utilizing intravenous administration of radio-copper to both normal individuals and patients with Wilson's Disease.[10] Serum was collected at timed intervals following administration of the isotope and subjected to electrophoretic separation. Such a procedure in normal individuals revealed the copper to be originally associated with serum albumin and was removed rapidly and concentrated in the liver. Labeled copper began to appear in the ceruloplasmin fraction four hours following administration. This incorporation continued and had not reached a plateau at 24 hours. In patients with Wilson's Disease, the copper^{64} remained associated with the albumin fraction and an appreciable amount had not accumulated in ceruloplasmin by 24 hours.

Scheinberg, Dubin and Harris[30] attempted to determine the half-life of ceruloplasmin in patients with Wilson's Disease by infusing purified ceruloplasmin preparation (from normal individuals) into three patients with Wilson's Disease and then measuring its rate of disappearance from the circulation. Their results indicated a half-life of 3.4, 4.4 and 4.7 days for the administered ceruloplasmin. Scheinberg and Sternlieb[31] repeated these measurements on two more patients in 1960 and found the half-life to be 5.6 and 7.2 days. If the decreased ceruloplasmin associated with Wilson's Disease were due to an increased rate of destruction (thus

assuming a normal synthetic rate) it would be necessary for the half-life of ceruloplasmin in the normal subjects to exceed 100 days. Such values are so much larger than those of the other plasma proteins to make it intrinsically unlikely. Thus it appeared to be established that Wilson's Disease is due to a decreased concentration of ceruloplasmin which in turn is due to a decreased ability to synthesize ceruloplasmin (or a precursor of ceruloplasmin). However, some evidence is now accumulating in the literature to indicate that depressed ceruloplasmin synthesis may not be the primary defect in Wilson's Disease. Sass-Kortsak, et al.,[32] studied two brothers with all of the symptoms of Wilson's Disease except the depressed plasma ceruloplasmin concentration. These brothers exhibited normal ceruloplasmin levels but one still had a marked delay in incorporation of copper[64] into ceruloplasmin. The finding of delayed incorporation of copper[64] in ceruloplasma, however, could be related to the fact that the administered radiocopper is markedly diluted by the tremendously expanded copper pool of these patients. Cartwright, et al.,[33] found that in 28 cases of Wilson's Disease, eight individuals had ceruloplasmin levels equal to the lower range seen in 205 normal subjects. Also, some normal relatives of patients with Wilson's Disease had decreased ceruloplasmin levels. Such levels had been present in two of these patients for at least eight years and the patients were beyond the age when Wilson's Disease usually becomes manifest. We have already noted earlier in this paper that over a dozen patients have now been studied and found to have normal ceruloplasmin levels.[28] These observations suggest that low ceruloplasmin in itself may not be responsible for the development of Wilson's Disease.

The role of ceruloplasmin in Wilson's Disease is uncertain, but the diagnosis of the disease is not precluded by finding a normal serum ceruloplasmin level. The reverse is also apparently true; a low ceruloplasmin level in the absence of other symptoms does not necessarily imply Wilson's Disease.

Many different attempts have been made to halt and reverse the course of Wilson's Disease. These include attempts to stimulate synthesis or delay degradation of ceruloplasmin. So little is known about its metabolism that progress has been slow in this area. More fruitful results have been obtained by attempts to prevent the accumulation of further copper in the body or to promote the loss of copper already deposited there.

The possibility that ceruloplasmin synthesis could be stimulated chemically was prompted by the finding that ceruloplasmin and the blood copper content were elevated during the latter part of pregnancy.[34-36] Meyer, et al.,[37] and Bearn[3] demonstrated that this elevation of ceruloplasmin and plasma copper was due to estrogen. Bearn[3] utilized estrogen therapy in seven patients in an attempt to restore ceruloplasmin to normal levels. This type of therapy was largely unsuccessful. Over a five week test period, ceruloplasmin was elevated in only three patients, a slight increase was noted in one, and no change was observed in the other three. No clinical improvement was noted but a five week trial period is a very short interval for assessing the value of a specific drug in a disease state which requires years to develop.

Another approach has been used to study the effects of normal plasma ceruloplasmin levels on the course of Wilson's Disease. Bickel[38] could find no improvement in three patients receiving intravenous infusions of purified human ceruloplasmin preparations for periods of three months to more than a year. Scheinberg and Sternlieb[31] could find no change in proportion of administered copper[64] excreted in the feces of two patients whose ceruloplasmin was raised to normal levels by the same means. Since ceruloplasmin contains 0.3% copper by weight, the administration of apoceruloplasmin (copper-free) which could re-combine with copper should remove excess tissue copper.[38] However, intravenous administration of human apoceruloplasmin to such patients, (or to normal individuals) results in almost immediate destruction or disappearance of the protein with no regeneration of ceruloplasmin. This is probably related to the fact that **in vivo** the ceruloplasmin molecule picks up copper only during synthesis.[39]

More successful results have been obtained by efforts to reduce the copper content of the body. Cumings[8] in 1948 proposed that BAL (2, 3-dimercaptopropanol) be used for this purpose. Mandelbrote[15] in that same year confirmed this by reporting that urinary copper excretion in Wilson's Disease was increased by the administration of BAL. Denny-Brown and Porter[14] tested this drug on five patients with Wilson's Disease and increased the copper excretion in all, but neurological improvement was obtained in only three. From other reports in the literature it became apparent that the greatest

success was seen in cases with predominant liver involvement or in cases diagnosed early in the disease before neurological symptoms have become pronounced. The chief disadvantage in using this drug results from the necessity to administer it by intramuscular injection; this is painful and is sometimes accompanied by headache, nausea, vomiting and dizziness.

Ethylenediaminetetracetic acid salt (EDTA, Versene) has been used on a limited scale but it does not cause cupriuria when administered orally.[9] This drug will produce a cupriuria (1-2 mg/day) on parenteral administration but does not produce clinical improvement. This may be because it does not supply sulfhydryl groups,[40] but more than likely it indicates the drug was used for a limited test period. Other substances (sodium diethyldithiocarbamate and desferrioxamine) have been used but in a very limited number of patients and cannot be evaluated as yet.[41-42]

Other treatments utilized include diets excluding copper-rich foods (shellfish, liver, mushrooms, nuts and drinking water from non-copper plumbing). This is rarely sufficient thus potassium sulfide is usually added to the diet.[9, 43] Potassium sulfide blocks copper absorption by forming insoluble copper sulfide. Cartwright, et al.[9] used copper balance studies and demonstrated a positive balance of 0.01 mg/day in normal subjects as compared to a positive balance of 0.56 mg/day in patients with Wilson's Disease. The addition of potassium sulfide to the diet produced a negative balance of 0.14 mg/day. The work of Zimdahl, Hyman and Stafford[44] supports the above findings, but even though a negative copper balance was achieved, no clinical improvement was noted. It must be pointed out again, however, treatment was continued for only a limited period of time.

In 1956 Walshe[45] proposed that the use of penicillamine (B, B-dimethylcysteine), a penicillin metabolite, might overcome the difficulties inherent in the use of BAL. This chelating agent increases urinary excretion of copper when administered orally and it is more effective than BAL, although it has only one sulfhydryl group while BAL has two such groups.[31] Within four years after its introduction it was clear that the removal of copper by penicillamine was a tremendous advance in treating patients with Wilson's Disease.[46-47] The substance was approved by the U. S. Food and Drug Administration for the treatment of Wilson's Disease in 1963. In the cases where penicillamine therapy has been unsuccessful it has apparently been due to low dosages or a short period of treatment. Many months or even years may be necessary for improvement to occur.[48] Also, irreversible damage may have existed prior to initiation of therapy.[43] Some hypersensitive reactions to penicillamine have been reported (skin rashes most commonly, rarely thrombocytopenia, leukopenia, fever, adenopathy and nephrotic syndrome) but they are usually reversible.[49] The toxicity of the drug may be related to an antagonism between penicillamine and vitamin B_6.[50] This anti-B_6 activity appears to be due to formation of thiazolidine (combination of penicillamine and pyridoxal phosphate). It is now recommended that penicillamine administration be accompanied by a vitamin B_6 supplement to the diet.

Since effective therapy is now available, it is imperative to make the correct diagnosis in both symptomatic and asymptomatic patients. The most typical symptoms are dysarthria and the Kayser-Fleischer rings; these two findings are sufficient for a diagnosis of Wilson's Disease. In other patients, without these typical symptoms, the following tests should be included.[51]

A. Ceruloplasmin concentration in serum:
   (1) Normal = 20-35 mg/100 ml
   (2) Wilson's Disease = less than 20 mg/100 ml
B. Hypercupriuria:
   (1) Normal = less than 50 ug/day
   (2) Wilson's Disease = more than 100 ug/day
C. Fate of oral radioactive copper:
   (1) Patients with Wilson's Disease incorporate little copper in ceruloplasmin and also concentrate less in the liver than do normal subjects.

Two principal hypotheses have been advanced in an attempt to explain the pathogenesis of Wilson's Disease. Uzman[52] postulates that tissue proteins exist which have an unusual copper affinity. The ceruloplasmin deficiency seen in most patients is the result of this diversion and little or no copper is available for the synthesis of ceruloplasmin. The primary genetic defect then is in the synthesis of proteins with extreme copper binding capacity. The increased copper absorption is explained as being due to an increased copper binding capacity in the intestinal mucosa (proteins with extreme copper binding capacity). The amino aciduria and peptiduria may be due to incomplete metabolism of the abnormal protein thus releasing

polypeptide residues with increased copper affinity. These chelated peptides may compete for tubular reabsorption with amino acids, causing amino aciduria.

The major criticism against this concept is the fact that in Wilson's Disease the copper in the lenticular nucleus is bound to proteins that are identical chromotographically with proteins from normal brains.[51] Also, the decreased ceruloplasmin concentration observed in Wilson's Disease precedes the amino aciduria. This suggests that the primary defect lies in the synthesis of ceruloplasmin and not in the metabolism of amino acids.

The second major hypothesis concerning the pathogenesis of Wilson's Disease assigns the primary genetic defect to an inability to synthesize ceruloplasmin (or to synthesize normal ceruloplasmin).[9] This causes an increased absorption of dietary copper which elevates the direct-reacting plasma copper. The lesions produced in the brain and liver are a result of the deposition of toxic amounts of copper in these organs. The excessive copper deposited in the kidney tubular cells may interfere with transport of amino acids by inhibition of essential enzymes.

The major question to be answered is why does copper accumulate in the tissues to toxic levels? An answer may be found in that the amount of copper absorbed per day is approximately equal to that incorporated into ceruloplasmin. It is possible that copper is normally excreted as part of the ceruloplasmin molecule following its catabolism. If this is the case then patients with Wilson's Disease could not excrete as much copper as normal subjects and would accumulate the absorbed copper in their tissues.[53]

Major criticisms have also been leveled at this concept. First it has already been pointed out that many patients with Wilson's Disease have ceruloplasmin levels which are very near the lower limits of that seen in normal individuals.[35] A very few such patients have ceruloplasmin concentrations within the normal range.[32] Secondly, there is little or no correlation between the age of onset and severity of Wilson's Disease with the patient's ceruloplasmin concentration. Third, the parents of patients do not develop the disease, hence they must be heterozygous for the abnormal gene, however, they occasionally do have ceruloplasmin levels as low as patients with Wilson's Disease.[3, 54] These criticisms may be explained in part as follows: Individual differences between intake and absorption of copper may explain the lack of a relationship between age of onset and severity of the disease to ceruloplasmin deficiency. The observation concerning patients with normal or near normal ceruloplasmin concentrations has, at least in some instances, been related to an increase in endogenous estrogens during pregnancy. It has been suggested that endogenous estrogens may also rise in Wilson's Disease as a result of hepatic decompensation with resultant failure to metabolize estrogens.[55] Heterozygotes probably do not develop Wilson's Disease since at least half of their ceruloplasmin would be of the normal variety. Thus, the disease may be the consequence of the synthesis of an abnormal ceruloplasmin rather than due to a quantitative deficiency of the normal protein.[53]

The basic defect would appear to be hepatic, but not necessarily related to an inability to synthesize ceruloplasmin. Some investigators are now attempting to demonstrate a failure to incorporate copper into the apoenzyme. If such an enzymatic defect can be proven it might well overcome many objections to the ceruloplasmin theory. None of the hypotheses explain why the lesion is confined primarily to the liver in some cases and to the brain in others. It may possibly be due to environmental or genetic influences still unassessed.

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Neurophysiological Basis of Behavior and Motivation[1]

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It has been stated that a majority of complaints heard by physicians derive in whole or in part from mental and emotional problems. The end result of such problems may be profound somatic, visceral or psychic dysfunction.

In the past 20 years imaginative researchers have boldly attacked such elusive problems as consciousness, emotion, sleep, wakefulness and motivation. A clearer understanding of the central neurophysiological mechanism underlying these states has gradually evolved. With this understanding has come a deeper insight into the complex mechanism of action of the psychotropic drugs that have proved so effective in the management of mental and emotional disorders in man.

A factor which has been contributory to a clearer understanding of the central neural mechanism of emotional and motivational behavior is the shift in emphasis from the cerebral cortex to functions of subcortical centers. Recent studies have singled out three of these subcortical systems, which, by mutual interplay, seem to control the patterns of affective behavior. The systems are: the hypothalamus, the reticular activating system, and the limbic system. A fourth system comprising the caudate and lentiform nuclei is emerging as an important mechanism in the discharge of adaptive homeostatic functions.

The Hypothalamus

Although Karplus and Kreidl[1] had performed some early experimental studies on the hypothalamus, knowledge of the function of this important region of the brain is relatively recent. A series of historically important papers by S. W. Ranson and his collaborators[2, 3] established that the hypothalamus was essential in heat regulation, water balance, cardiovascular reflexes, metabolism, sleep and sexual activity; thus serving as a region of the brain in which highly organized visceral and somatic reaction patterns are integrated.

While early evidence[4-12] had showed that the cerebral cortex was not necessary for affective behavior, the work of Philip Bard at Johns Hopkins indicated that a broad range of primitively organized patterns of affective behavior were laid down in the neural organization of the hypothalamus.[13] Although these responses were stereotyped patterns, not fragments, of directed behavior, they were limited in a functional sense and required some restraining influence (presumably from the cerebral cortex[14]) to time and order them into balanced responses.[15]

The Limbic System

Present interpretation of the neural substrate of affective behavior and allied states can be said to date from Kluver and Bucy's classic study of bilateral temporal lobectomy in the monkey presented to the 1937 meeting of the American Physiological Society.[16] The behavioral alterations included [17] (a) psychic blindness, (b) oral compulsive behavior, (c) hypermetamorphosis, (d) loss of fear and loss of aggressiveness, (e) hypersexuality, (f) spontaneous motor activity, and (g) changes in dietary habit.

A few months later, J. W. Papez[18] issued a speculative paper entitled "A Proposed Mechanism of Emotion." Arguing that emotional behavior was a physiological process dependent upon strict neuroanatomical mechanisms, Papez proposed that the limbic structures; the hypothalamus, the anterior thalamic nuclei, the gyrus cinguli, the hippocampus and their interconnections, act as an "harmonious mechanism" responsible for emotional expression. According

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[1] Presented at a symposium on Cellular Response in Health and Disease presented at the University of South Dakota, School of Medicine November 12, 13, 1965. The material represents a section of a course in neurophysiology offered to advanced graduate students.

to Papez, afferent pathways from receptor organs split into three routes as depicted in figure 1. Papez placed considerable emphasis on the mammillary nuclei and their thalmocortical connections as being responsible for emotional feeling and consciousness.

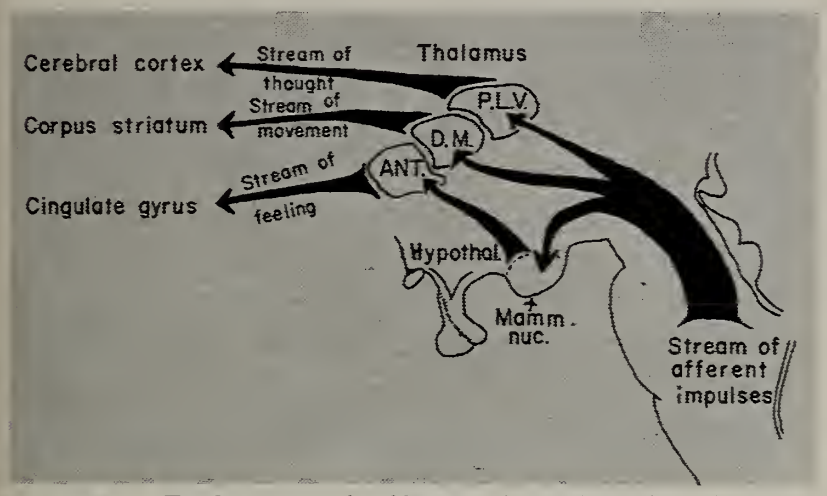


Figure 1. Pathways of afferent impulses involved in emotional behavior. According to Papez.[18]

The limbic system is complex. It is fed on the afferent side by visceral and somatic structures and it discharges into midbrain areas. This system, forming an arcuate convolution on the medial hemispheric wall, is made up of (anterior to posterior) the subcallosal gyrus, cingulate gyrus, hippocampus and adjacent structures (subiculum, facia dentata, entorhinal cortex) and the amygdala. This cerebral convolution was named the limbic lobe by Broca[19] (forms a margin around the brain stem), the rhinencephalon by Kolliker[20] (earlier belief that it was associated with the sense of smell), and the visceral brain by McLean[21] (associated with visceral responses). Anatomically and histologically the limbic cortex is primitive in comparison to the neocortex[22] and its development and organization remain relatively constant throughout the mammalian species.[23]

The general view of most early morphologists had been that the hippocampus, hippocampal gyrus, the amygdaloid nucleus and their afferent and efferent neural tracts were concerned with olfactory functions. Both anatomic and physiologic observations failed to support this.[24]

The amygdala (or amygdaloid nucleus) is a subcortical nucleus of the limbic system. In mammals it is partly continuous with the lentiform nucleus dorsally and, in the human, it is part of the uncus of the hippocampal gyrus. The amygdala is subdivided into several subnuclear groups; (1) a phylogenetically older anteromedial division, consisting of medial, cortical and central nuclei, and (2) a phylogenetically younger basolateral division consisting of a lateral, a basal, and an accessory basal nucleus. With phylogenetic development there is a gradual reduction of the corticomedial complex and a corresponding complexity in the basolateral complex.[25] The neural projection system of the amygdala, i.e., the stria terminalis and the massive ventral fiber system, while wide spread, in part converge upon common neuronal pools of the septo-preoptic-ventral anterior hypothalamic region.[26, 27]

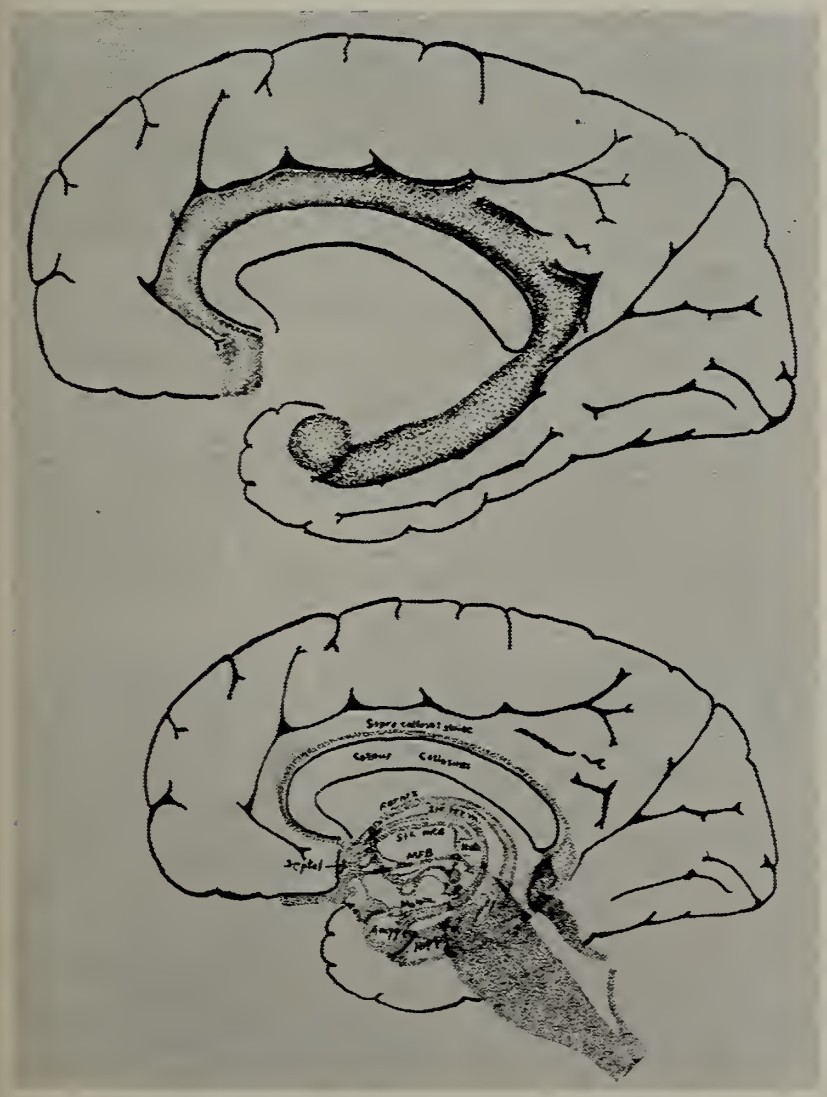


Figure 2. The phylogenetically old limbic system and its afferent and efferent connections. According to Broca,[19] Kolliker[20] and McLean.[21]

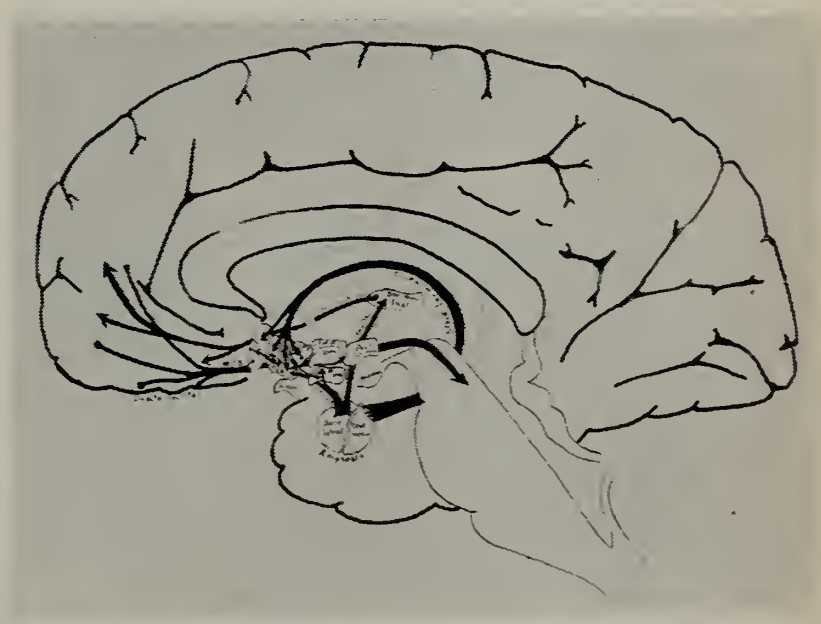


Figure 3. The neural projection system of the amygdala which, in part, converge on neurous of the septo-preoptic-ant. hypothalamic area. From Gloor[26] and Nauta.[27]

The hippocampus discharges efferents through the fornix to the septal nuclei, hypothalamus, brain stem and to the mammillary nuclei.[28] The hippocampus receives afferents from the septal nuclei through the fornix[29] and from the cingulate and temporal gyri through the tempero-ammonic connections.

In the late 1940's important investigations were begun and a clearer understanding of the functions of this region began to emerge. McLean[30] studied this extensively. He concluded that there exists in the limbic system the neural organizations for the two basic drives: (a) preservation of the self (feeding and ancillary responses of search and defense of food) involving the amygdala, and (b) preservation of the species (reproduction) involving the septal area and **parts** of the hippocampus. Stimulation of the amygdala gave responses such as licking, chewing, sniffing, biting as well as growling and combative behavior. Stimulation of the hippocampus gave grooming and pleasure reactions and seemed to organize a stereotyped response into a dynamic behavioral pattern.[31]

Papez[32] felt that it was possible to distinguish three neural circuits in this limbic system, all of which operated through the hypothalamus. One circuit, through the basal and accessory basal amygdaloid nuclei, controlled the motor behavior of feeding (search, feeding, defense of food). The second neural circuit, through the lateral amygdaloid nucleus, was an inhibitory circuit and responsible for docility, affection and emotional control. The third neural circuit, through the hippocampus was responsible for emotional moods (likes and dislikes, love and hate). McLean[33] also agreed with this, i.e., (a) amygdala concerned with feeding and behavior involved in the struggle for food, (b) the septum and hippocampus concerned with expressive states related to sociability and reproduction, and (c) mammillary and anterior thalamic nuclei to the cingulate cortex, responsible for feeling states associated with the two basic processes of life. McLean suggested that removal of the amygdala gave release to other parts of the brain concerned with sexual behavior, i.e., the amygdala normally suppressed this sphere of activity. This seems reasonable when one considers that the amygdala is responsible for aggressive behavior in a search and defense response during which time grooming and reproductive responses would be suppressed. Indeed, removal of the amygdala produced a docile animal.[34, 35] On the other hand, animals may be made savage by septal lesions,[36] implying that the aggressive-defense behavior pattern from the amygdala is normally suppressed by the septal nuclei. In any event, the data suggest multiple neural circuits from the amygdala operating through other subcortical centers for the control of feeding and defense-attack. Some functional localization within the amygdala exists for these responses,[37] which appear to operate through the hypothalamus.[38] Through efferent pathways to the septal nuclei, the amygdala appears to operate a circuit which is not only inhibitory to the feeding-defense behavior but is an activator circuit for docility and affection. Similarly, through the preoptic, supraoptic, para-ventricular and tuberal hypothalamic nuclei, the amygdala serves to integrate viscero-somatic activities with endocrine production.

The total somatic and visceral afferent inflow to the limbic system determines the relative balance of the various behavioral neural circuits thus dictating the final behavior pattern. The neural behavioral circuits are mutually occlusive and the final behavior is not activity in one circuit and lack of activity in others, but how intense are all circuits activated or inhibited relative to each other. It is reasonable to conclude that afferent input and intrinsic



Aggressive circuit for feeding, search and defense.

(From Papez)

Inhibitory circuit for docility and affection

Circuit for expression of emotional moods (likes and dislikes, love and hate, etc.)

Fig. 4

humoral effects act to drive the neural circuits.

The implications of the above are that there exists in the limbic system a series of multi-neuronal circuits responsible for certain basic drives. While the circuits are functionally separate, they do flow into and utilize common elements, particularly within the hypothalamus.[39, 40] Within the circuits, for instance the amygdala, different sensory modalities may converge on the same unit.[41] Thus, different sensory modalities may activate and potentiate single drives.

An important aspect of this interpretation is why and how are specific neural circuits activated. It is possible to gain some insight into this by considering some interesting experiments of Dr. A. E. Fisher.[42] Dr. Fisher, arguing that electrical stimulation was not selective, i.e. it will fire any nerve cell indiscriminately, chose to deposit tiny crystals of solid chemicals at selective sites in the brain. Such chemicals are localized and will fire only those nerve cells whose synaptic transmitter is, or closely similar to, the deposited drug. Testosterone deposited at a specific site in the hypothalamus caused the male rat to carry out maternal and nesting behavior (injection of the same drug slightly to one side caused the rat to engage in male sexual activity). Testosterone deposited at specific sites caused the female rat to engage in male activities.

Similarly, S. P. Grossman[43] showed that epinephrine, or better norepinephrine, injected into a specific site in the lateral hypothalamus would cause a well fed rat to start eating. Acetylcholine injected at the same site led to a marked increase in water ingestion. In the latter case, Grossman[44] provided evidence for the specificity of cholinergic action by demonstrating that systemically or centrally applied cholinergic blocking agents could decrease the effectiveness of deposited acetylcholine or would decrease the water intake in water deprived animals. A cholinesterase inhibitor (physostigmine), increased water intake. Chemical stimulation appears to have specific motivational properties sufficiently similar to the normal drive as to elicit differential behavior in an operant conditioning stimulus. Following cholinergic stimulation, sated rats pressed a lever to obtain water but did not press an adjacent bar to obtain food. Adrenergic stimulation of the brain reversed the response; i.e. the rats pressed a lever to obtain food but did not press an adjacent lever to obtain water.[45] Precursors of nor-epinephrine (dopamine) and acetylcholine (dimethylamino-ethanol) mimicked the effect of adrenergic and cholinergic stimulation. Adrenergic (dibenzyline or ethoxybutamoxane) or cholinergic (atropine) blocking agents depressed the feeding or drinking responses selectively whether the blocking drugs were implanted in the brain or administered systemically.[46] Similar results were obtained by chemical stimulation in the amygdaloid nucleus, although here, amygdaloid stimulation would produce a response only in a deprived animal, not in a sated animal.[47] Fisher and Coury[48] systematically mapped the chemically stimulated area and found it to correspond to the Papez circuit.

It seems from these studies, and implied in those of Olds[49] on self stimulation, that drive-directed behavior is dependent upon patterned neuronal circuits in the limbic system and midbrain, the activation of each circuit depending upon a specific chemical transmitter substance.[50]

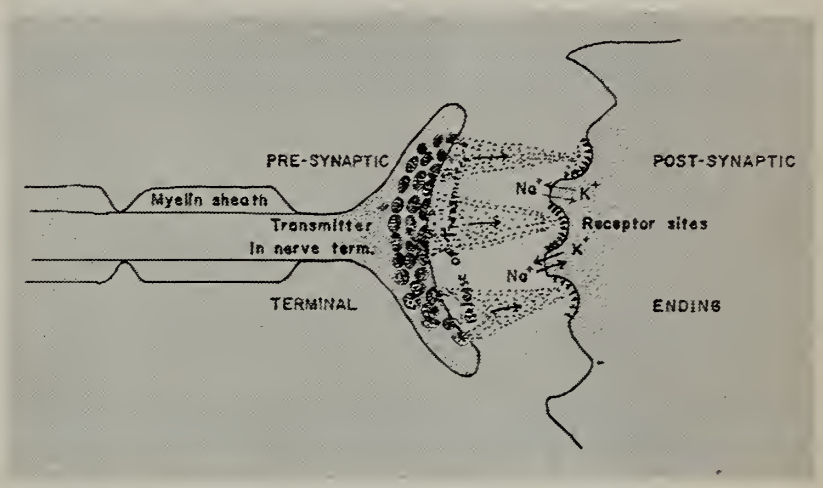


Figure 5. Chemical transmission of nerve impulse. Nerve impulse in the pre-synaptic terminal causes the release of transmitter from vesicles in nerve terminals. Transmitter diffuses across synaptic space and combines with special receptor site on post-synaptic endings. Combination of receptor and transmitter causes increase in permeability to ions. Na+ moving into the cell, discharges the membrane potential to a critical threshold and generating an impulse in the post-synaptic ending. The transmitter is rapidly destroyed by specific enzymes. The transmitter may hyper-polarize the membrane and cause active inhibition of the post-synaptic element.

The Reticular Activating System

Following the initial observations of Rhinberger and Jasper[51] and Bremer[52-54] on EEG activation by sensory stimulation, Moruzzi and Magoun[55] noted that direct stimulation of the central reticular formation of the brain stem reproduced all the electrocortical features observed in the EEG arousal reaction associated with wakefulness. Subsequent work has defined the physiology of this reticular activating system (RAS). There appear to be two RAS's, one which bypasses the thalamus and is distrib-

uted over the entire cerebral cortex[56] and the other which connects with the midline and intralaminar nuclei of the thalamus and thence relayed to the cortex via a diffuse thalmocortical projection.[57] The first, the direct reticulocortical system, causes a general arousal of the cortex. The second or non-specific thalmocortical projection system, constitutes the more rostral portion of the ascending reticular activating system and is responsible for the alerting response. From some regions of the cortex there appears to be a cortico-thalamic feed back mechanism which is responsible for attention, i.e. the cortex may determine what sensory input it will allow to alert, while blocking others.[58, 59]

The great sensory lemniscal systems, while relaying in the specific sensory nuclei of the thalamus and thence to the specific cortical receiving areas, also send impulses into the reticular formation.[60] Once in the reticular formation specific sensory modalities are lost.[61] There does appear to be some topographical organization in the intralaminar nuclei of the thalamus with respect to the projection area of the cerebral cortex[62, 63] and unit studies of the reticular formation indicate some functional organization by the fact that some cells respond to one type of sensory input and not to others.[64]

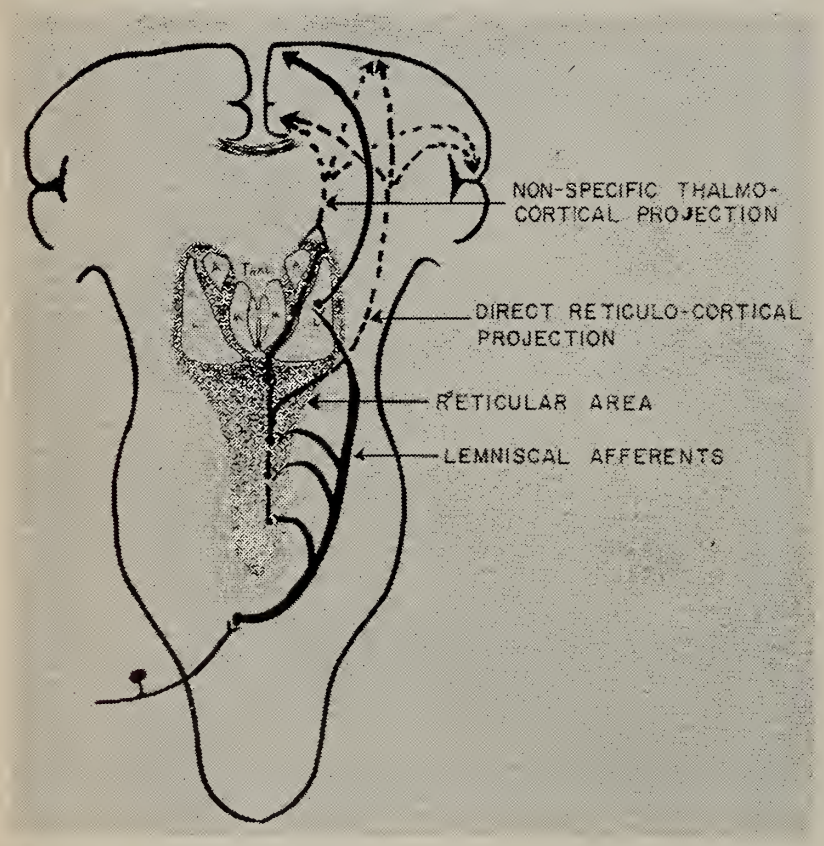


Figure 6. The ascending reticular activating system (stippled). Sensory impulses relay into the central reticular core and serve to arouse (direct reticulocortical projection) and alert (thalamo-cortical projection) the cerebral cortex. From Moruzzi and Magoun,[55] Starzl, et al.,[56] and Jasper.[57]

This simply means that the reticular (and limbic) system is organized around functional response patterns and not around specific sensory modalities.

It is known that the brain stem and the limbic system (including the strio-pallidal system) contain a high concentration of nor-epinephrine (NE)[65] acetylcholine (Ach),[66] 5-hydroxytryptamine (5-HT; serontonin)[67] and dopamine (DOPA).[68] The neurons of the reticular formation are sensitive (activated or inhibited) to Ach, NE and 5-HT, although in a complex way. In any one explored area, from 22 to 35 percent of the neurons were found to be stimulated by Ach, and from 7 to 12 percent were found to be inhibited by Ach, the remainder apparently not responding.[69, 70]

The effect of NE on midbrain neurons is equivocal. In some instances no response was obtained [71] and in others the response was related to blood pressure changes.[72, 73] Nevertheless, the presence of catecholamine terminals in the brain stem,[74] hypothalamus[75] and the amygdala-hippocampal formation[76] suggest NE as a transmitter substance. Recent studies[77] have indicated that in any one explored area of the medullary reticular formation, approximately 29 percent of neurons were excited by NE and 19 percent were inhibited. The remainder were uninfluenced.

The presence of 5-HT in nerve terminals in the medulla and pons[74] suggests that this substance is a natural transmitter. In most regions of the brain, 5-HT has proved to be an inhibitor of neurons[78, 79] while in the medulla and pons approximately 40 percent of neurons were excited and 49 percent were inhibited by the substance.[77]

What is a most interesting observation in the latter paper is that some neurons seemed to be stimulated by both Ach and NE; some neurons were stimulated by Ach and 5-HT but were inhibited by NE; and some were stimulated by all three. While such results require cautious interpretation, it does suggest that the neural organization of this system is based on complex behavioral patterns of multineuronal circuits, each with a specific chemical transmitter in which some neuronal elements are common to more than one circuit.

Lesions confined to the central brain stem, sparing the long sensory paths, produce a deep coma in which neither behavioral or EEG arousal can be evoked by strong afferent stimulation.[80] Further, it was natural to suspect that a lack of, or a depression of, activity in the RAS could account for natural sleep.[81] The problem appears to be more complex. While arousal from

sleep is easily explained by an increase in the activity of the ascending reticular activating system, it is difficult to explain how, or why, the activating influence which characterizes the waking state decreases at the onset of sleep and why it should remain decreased for hours, i.e., as long as sleep lasts.

Such considerations led to the natural conclusion that sleep constituted an active process. The evidence points to a cholinergic activated neural system formed by a continuous descending multi-synaptic circuit projecting from limbic forebrain structures (amygdala, hippocampus, septal area) through highly defined pathways within the medial forebrain bundle (MFB) into the limbic midbrain area caudal to the mesodiencephalic arousal area.[83] This system, closely associated with the solitary nucleus (particularly the rostral pole)[84] brings about sleep by inhibiting the more rostral activating system.

Thus, there appear to be two systems present in the limbic neuronal circuits: (a) a sleep inducing hypnogenic system which increases central parasympathetic output, decreases motor activity and lowers responsiveness to external stimuli (acetylcholine[85] or 5-hydroxytryptamine[86] activated), and (b) an awakening or arousal system; increases central sympathic output, mobilizes energy substrates, increases motor output and exaggerates responses to environmental change (nor-epinephrine activated).[87, 88] The two systems are reciprocally connected and mutually antagonistic. Activity in one will suppress activity in the other, and vice-versa, thereby giving rise to the sleep-waking cycle.[89] The cerebral cortex appears to be unnecessary for the sleep-waking cycle.

Psychotropic Drugs

General anesthetic agents, ether or barbiturates, depress the reticular activating system.[90, 91] Loss of wakefulness and incapacity of afferent stimulation to induce EEG arousal in anesthesia have been attributed to this effect. It should be pointed out that the anesthetic agents are not limited to a depression of the RAS but it seems reasonable to conclude that their most obvious action (anesthesia) is on the RAS.

It is increasingly evident that the tranquilizing and antidepressant drugs operate on the limbic system, although in a complex way. There are three major subdivisions in the tranquilizer group of drugs; the phenothiazines, of which chlorpromazine (Thorazine) is the principal example; the Rauwolfia derivatives, typified by reserpine; and the substituted propanediols, of which meprobamate is an example. The antidepressants include: the iminodibenzyls, characterized by imipramine (Trofanil), and the monamine oxidase (MAO) inhibitors, typified by iproniazid (Marsilid).

An important discovery was that the administration of reserpine was followed by depletion of the monamines of the brain.[92] This depletion was associated with tranquilization,[95, 96] presumably by depression of central adrenergic alerting mechanisms.[97] A more recent interpretation[98] is that reserpine tranquilization is due to a block of 5-HT storage resulting in a continuous inhibitory activity of this amine at central synapses. In contrast, the MAO inhibitors increase the brain amines,[99, 100] resulting in psychomotor stimulation[101] and lifting of depression.[100] The phenothiazines (chlorpromazine) and the iminodibenzyls (imipramine) diminish cellular permeability[102] thus prolonging the effect of the neurotransmitter. In addition, an important action of the phenothiazines is to render the receptor site less available to transmitter substance, thus diminishing the effect of the transmitter. The antidepressant activity of imipramine is apparently mediated through a metabolic product, desmethylimipramine, formed by removal of one methyl group from the side chain nitrogen.[103]

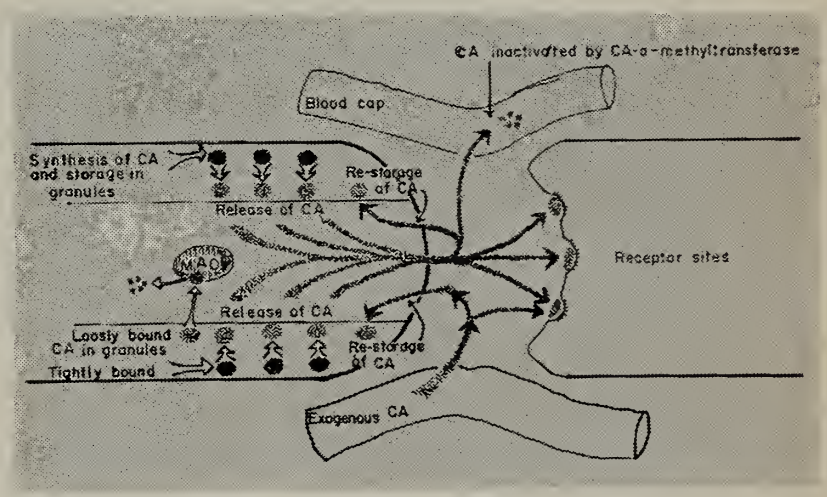


Figure 7. Schematic representation of cells of a nerve ending and a post-synaptic cell membrane. CA (norepinephrine) is synthesized in the nerve and the last step in synthesis, the B-hydroxylation of dopamine, also binds the CA in the granulated vesicles of sympathetic nerves. The storage is in two forms; (a) an easily releasable form, and (b) a tightly bound form. When norepinephrine is released it is metabolized by MAO inside the nerve or by catechol-O-methyltransferase (COMT) outside the nerve. A portion of released catecholamine may be inactivated by being bound again, or if it diffuses into the circulation it is inactivated by COMT. CA, brought to the site, may be bound and inactivated. Reserpine blocks the storage of CA; chlorpromazine blocks the receptor site; MAO inhibitor prevents breakdown of CA and increases their concentration; imipramine prevents the return of free CA into the cell.

It is conceptually simpler to think in terms of a central subcortical neural core whose main action consists of: (a) an activating (NE) and (b) an inhibiting (Ach or 5-HT) influence on CNS structures. The two great divisions of psychotropic drugs could then be said to cause release of NE (antidepressants) or release of Ach or 5-HT, or depression of NE responses, (tranquilizers). However, there are differences between the components of each division, i.e., between the phenothiazines and Rauwolfia alkaloids on the one hand and between the iminodibenzyls and MAO inhibitors on the other. Indeed, the phenothiazines and the iminodibenzyls share some of the activities of each other. Such considerations have led to the belief that the action of psychotropic drugs has a much broader base than that limited to a specified neuron pool. The psycho-active drugs exert actions on the structures forming the limbic system and, as the limbic system is concerned with behavioral patterns of a biological quality (feeding, defense, attack), the psychotropic drugs may be activating or suppressing, not neuronal pools indiscriminately, but neural circuits of behavior patterns. For instance, chlorpromazine has a selective blocking effect on the defense response but leaves the feeding response intact, although not stimulated.[104] Chlordiazepoxide (Librium) also blocks the defense-attack circuit but, in addition, stimulates a feeding circuit increasing food intake.[105] Chlorpromazine **increases** activity in the amygdala[106] which ultimately spreads to the hippocampus and septum (this is likely the circuit suppressing the defense-attack behavior). Chlordiazepoxide (Librium), on the other hand, **attenuates** amygdala activity[107] but **stimulates** the hippocampus.[108] The latter would appear to be the basis for the marked taming effect of chlordiazepoxide on vicious animals. Chlorpromazine prevents sham rage in decerebrate animals,[109] while chlordiazepoxide is particularly effective in rats with septal lesions.[105] Similarly, differences of the tranquilizers in suppressing an aggressive-attack response have been noted in rats in which the aggressive response has been induced by cage isolation[110] or electric shock[111] Meprobamate inhibits amygdala, hippocampal[112] and septal[113] after discharge, while leaving the midbrain arousal mechanism unaffected.[114] Pentobarbital, on the other hand, decreases the sensitivity of limbic structures,[114] but, in addition, depresses the midbrain arousal mechanism.[115] The anti-depressants stimulate limbic structures (particularly the amygdala) and render these structures so sensitive that spontaneous discharge may be seen.

As outlined here, the limbic system appears to contain the most invariant parts of the mammalian cortex. Within this system is found the neuronal circuitry concerned with the innate mechanism that operates the basic behavioral requirement. The limbic system discharges into the midbrain reticular fields which govern the total behavior. This system provides the time-oriented force which keeps all goal directed behavior in full progress until the goal is reached.

One problem that arises is whether the same system governs all behavior patterns or whether there are sets of systems (neuronal circuits) with some overlapping and interaction. The pharmacology of centrally acting drugs provides a partial answer to this problem. Drugs with the same over-all action (tranquilizers) should elicit the same response in the system if one system governs all behavior patterns. That this is not the case is well documented. The variable response of structures within the limbic system to drugs with a similar over-all action (tranquilizers) suggests the presence of multiple behavioral circuits.

Behavior evolves from within outward; from visceral to expressive to affective.[116] Primitive drives are laid down in neural circuits within a central neural core and constitute the basis of man's behavior. The neural circuits are chemically driven and can be chemically modified. Psychotropic drugs selectively drive or suppress the primitive neural circuits and thus modify affective behavior.

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SOUTH DAKOTA RESOLUTION REGARDING EMERGENCY CALLS APPROVED BY A.M.A. HOUSE OF DELEGATES

The South Dakota resolution, "That the American Medical Association recommend that the Joint Commission on Accreditation of Hospitals delete the time limit in question, and substitute 'The patient should be seen within a reasonable length of time relating to the disease or injury that exists.'" was presented to the A.M.A. House of Delegates by the representatives from South Dakota in June. Dr. Robert Quinn spoke before the Reference Committee concerning this Resolution and the following recommendation came forth from the Committee: "In considering Resolution 6, your Reference Committee was pleased to note that the Commissioners of the Joint Commission on Accreditation of Hospitals recognize the problem posed by the fifteen minute limitation at their meeting of March 19. They agreed at that time that future publications of the JCAH would be appropriately modified. Thus, the intent of Resolution 6 would be achieved. Further, the Director of the Joint Commission informed the committee that the substitute phraseology suggested Resolution 6 would seem to be in accord with the thinking of the commissioners regarding such modification."

The Reference Committee further went on to state that they therefore "moved adoption of Resolution 6 with the following substitute resolve, to wit: resolved, That the A.M.A. direct its Commissioners on the Joint Commission to urge adoption by that body of the statement that 'The patient shall be seen within a reasonable length of time relating to the disease or injury that exists.'"

A previous discussion regarding this matter appeared on the editorial page of the Journal in the July, 1966 issue. It would seem that the fears of members of the South Dakota Medical Association in regard to the dictates of the M.C. were shared by physicians elsewhere.

J. B. Gregg, M.D.

AMERICAN COLLEGE OF PHYSICIANS FOR SOUTH DAKOTA

Seventh Annual State Meeting

A cordial invitation is extended to all Fellows and Associates and to all interested physicians to attend the Seventh Annual State Meeting of the American College of Physicians for South Dakota to be held Friday, September 23, and Saturday morning, September 24, 1966, at the Guest House Motel, Watertown, South Dakota.

PROGRAM

South Dakota Society of Internal Medicine
John W. Argabrite, M.D., President, Presiding
Friday Morning, September 23, 1966

A.M.
9:00 Business Meeting
Guest: Robert S. Long, M.D., F.A.C.P., Omaha, Nebraska, Trustee ASIM, Representative of the National Office of ASIM, San Francisco.
12:00 Luncheon — Guest House Motel

Regional Meeting of the American College of Physicians of South Dakota

SCIENTIFIC PROGRAM

Gordon S. Paulson, M.D., F.A.C.P., Presiding

P. M.
1:00 Registration at the Guest House Conference Room
1:30 The Use of the Catheter Electrode in Cardiac Pacemaking
Mario Herrera, M.D. (by invitation) Aberdeen, South Dakota
Discussant: Warren Jones, M.D. (Associate) Sioux Falls, South Dakota
2:00 Endocardial Fibroelastosis, Case Report
William B. Janss, M.D., (by invitation) Rapid City, South Dakota
Discussant: John L. Calene, M.D., F.A.C.P., Aberdeen, South Dakota
2:30 The Use of Cytoxan (Cyclophosphamide) in Diverse Solid Malignant Tumors
William R. Taylor, M.D. (Associate) Aberdeen, South Dakota
Discussant: M. E. Sanders, M.D., (by invitation) Redfield, South Dakota
3:00 Introduction of distinguished guests
Wright Adams, M.D., F.A.C.P., Vice President, American College of Physicians
3:15 Intermission
3:45 Exercise Myoglobinuria
H. Streeter Shining, M.D., (by invitation) Rapid City, South Dakota
Discussant: Clifford F. Gryte, M.D., (by invitation) Huron, South Dakota
4:15 Protean Manifestations of Connected Tissue Disease with the Report of a Case
John W. Donahoe, M.D., (by invitation) Sioux Falls, South Dakota
Discussant: R. J. Ogborn, M.D. (by invitation) Sioux Falls, South Dakota
4:45 Congenital Aplastic Anemia, Report of Two Cases in a Family
Donald L. Kegaries, M.D., F.A.C.P., Rapid City, South Dakota
Discussant: Stephen Kahler, M.D. (by invitation) Sioux Falls, South Dakota

Friday Evening, September 23, 1966

6:00 Social Hour — Guest House Conference Room
7:00 Banquet — Guest House Banquet Room
Toastmaster — John W. Argabrite, M.D.
Speaker —Wright Adams, M.D., F.A.C.P.
Vice President, American College of Physicians

Saturday, September 24, 1966
Donald L. Kegaries, M.D., F.A.C.P., Presiding

9:00 to 10:30 What's New in Endocrinology
William E. Mayberry, M.D., Mayo Clinic, Rochester, Minnesota
Donald A. Scholz, M.D., F.A.C.P., Mayo Clinic, Rochester, Minnesota
10:30 Coffee Break
10:45 to 12:00 Open discussion on any endocrinology subjects
Questions invited from the members and guests

PRESIDENT'S PAGE



I have just returned from the Public Relations meeting sponsored by the AMA, in Chicago. If there is anything our profession needs, it is a clearer understanding and more efficient utilization of honest public relations technique.

It has been my experience that one dissatisfied, hostile patient will tell ten times as many people of his unhappy experience as will the satisfied patient. This would indicate that, basically, we all are individually responsible at the level of our personal relationships for the over-all public relations program of our profession. It is an easy step from hostility toward one physician to hostility to all physicians.

Let us all remember that our one basic concern is for the welfare of the patient and the curing of his disease, and that a good personal relationship with patients and community is necessary for the attainment of this goal.

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President

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News Notes • Changes • Births • News

Pop's Proverb

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FUTURE MEETINGS

American College of Surgeons:

Annual Clinical Congress
October 9-14, 1966
San Francisco, California
Sectional Meeting
February 15-17, 1967
Broadmoor Hotel,
Colorado Springs

FILM AVAILABLE

"The Measurement of Depression" is a film depicting the development, validation, and use of a scale for the quantitative measurement of depression.

The scale was designed by Dr. William W. K. Zung, Durham, North Carolina, psychiatrist. Although initially devised for use in psychiatric research, it readily lends itself to the general practice of medicine where most depressions are first encountered.

The film is designed for medical educational purposes at meetings of hospital staffs, county societies or specialty groups. The self-rating scales, available in quantity for use in office practice, come complete with full instructions.

Both the film and pads of the self-rating scale are available free upon request from Lakeside Laboratories, Inc., Milwaukee, Wisconsin.

* * *

E. H. Heinrichs, M.D., Watertown, South Dakota, was admitted as a Fellow of the American College of Chest Physicians at their June meeting in Chicago, Illinois.

* * *

Dr. Carlos Mendoza, former psychiatrist-medical director of the Central South Dakota Mental Health Center in Huron, is now the chief psychiatrist of the Modesto State Hospital, Modesto, California.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

The Bartron Clinic has announced the addition to its department of surgery of **David F. Piro, M.D.,** Seattle, Washington.

Dr. Piro is currently chief of surgery services at the U. S. Army Hospital, Fort Ord, California. Upon his discharge he and his family will move to Watertown.

* * *

The National Association of Blue Shield Plans has won a key court decision to protect the Blue Shield name and symbol.

The 5th United States Circuit Court of Appeals recently reversed a lower court decision permitting the United Bankers Life Insurance Company, a Texas firm, to use the name and symbol "Red Shield." The higher court ruled that the words and the symbol "Red Shield" are confusingly similar to Blue Shield.

* * *

The Medical Clinic of Yankton has announced the addition of a new associate to its staff. He is **Dr. Morris L. Radack.** Dr. Radack has just completed his residency in internal medicine in Minneapolis, Minnesota.

Dr. Radack is a native of South Dakota, is married and has two daughters.

The community of Hoven, South Dakota, recently welcomed a new physician, **John O'Sullivan, M.D.** Dr. O'Sullivan comes from the Gutherie Clinic, Sayre, Pennsylvania.

* * *

July 31st was **"Dr. John C. Hagin Day"** in Miller, South Dakota. On that date the new addition of the Prairie Center was dedicated. Known as the "John C. Hagin Annex" it will provide for an enlarged ministry for the care of the elderly of Miller and the surrounding area.

* * *

Jerome P. Pucelik, M.D., has begun practice at the Aberdeen Medical Center. Dr. Pucelik, a surgeon, is associated in practice with **Dr. A. J. Janusz.**

Dr. Pucelik is a native of Omaha, Nebraska. He is married, and has four daughters.

* * *

Eugene Regier, M.D., recently joined the staff of the Physicians Medical Center in Canton, South Dakota. Originally from Aurora, Nebraska, Dr. Regier is a graduate of Washburn University and the University of Nebraska Medical School. He recently completed his internship at Sioux Valley Hospital in Sioux Falls.



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JOURNAL OF MEDICINE

OCTOBER • 1966



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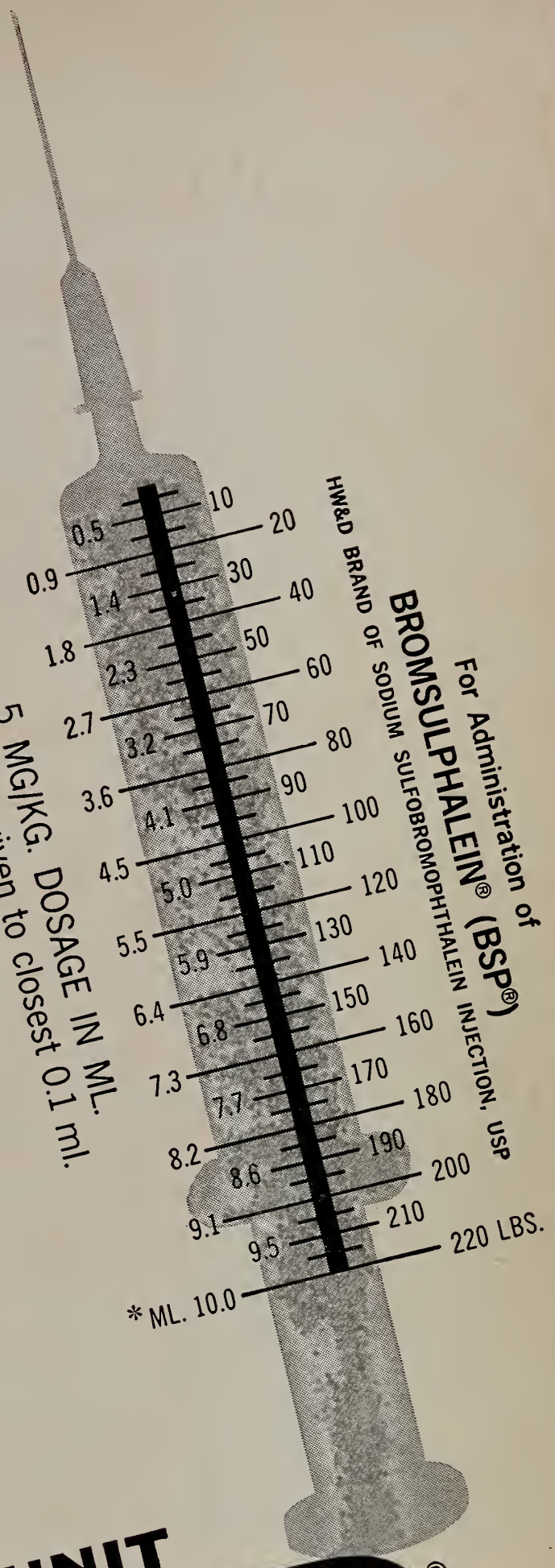
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JOURNAL OF MEDICINE

**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **October, 1966** **Number 10**

CONTENTS

Ligamentous Injuries About the Knee 23
Ronald L. Linscheid, M.D.

I. Differential Study of Cardiogenic Syncope with the Utilization of Radiotelemetry 27
Joseph D. Welty, Ph.D.; Warren L. Jones, M.D.; Robert R. Raszkowski, M.A.

II. The Application of Artificial Cardiac Pacemaking in the Community Hospital 33
Warren L. Jones, M.D.; Joseph D. Welty, Ph.D.; Robert R. Raszkowski, M.A.

The Role of Congress and the Physician in Meeting Health Needs . 39
Senator George McGovern

S. D. Doctor Heads Viet Nam Surgical Team 42
Ronald Ross

Deadwood Doctor 44
F. S. Howe, M.D.

President's Page 46

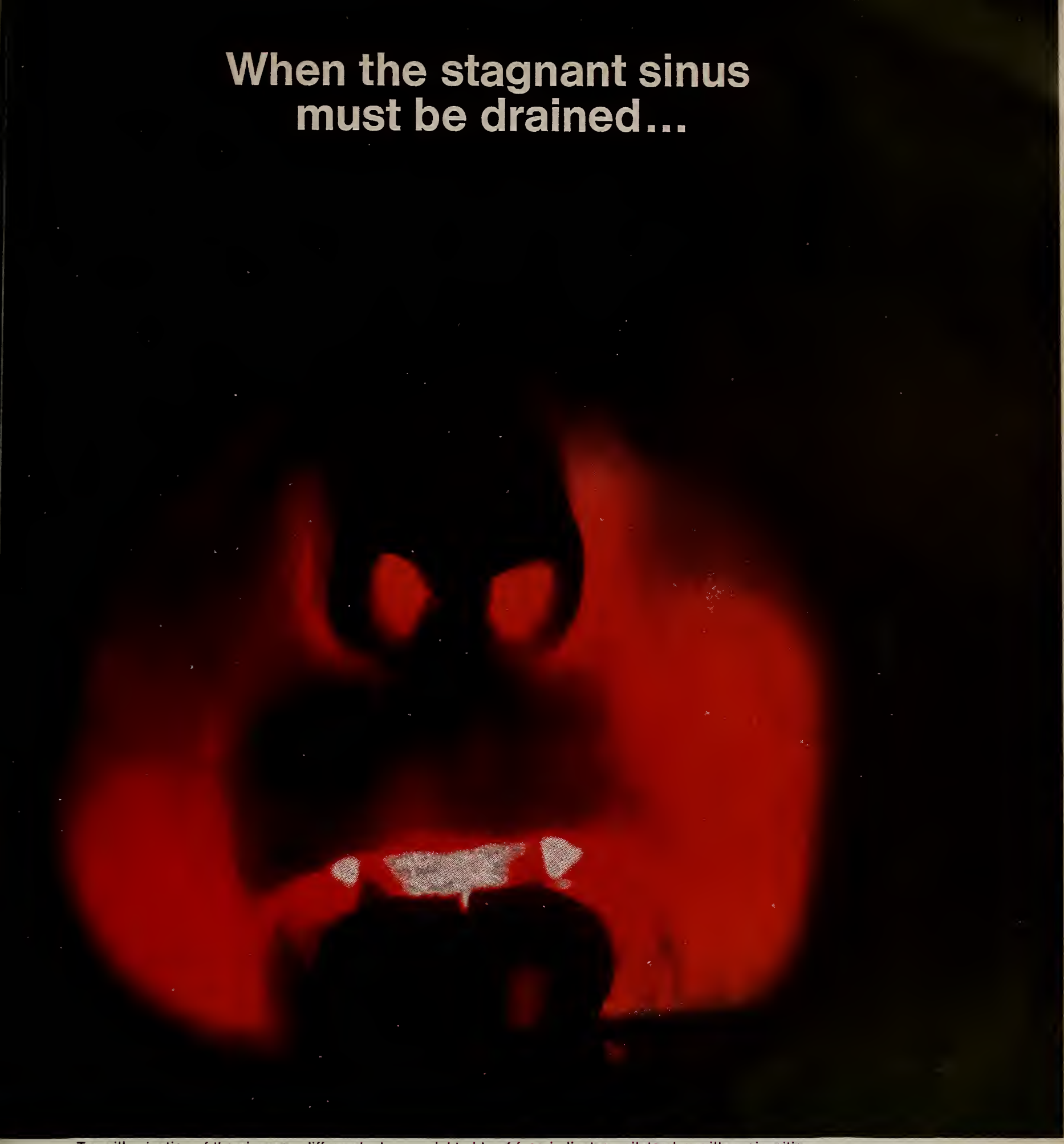
Letter to the Editor 47

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LIGAMENTOUS INJURIES ABOUT THE KNEE*

Ronald L. Linscheid, M.D.†
Rochester, Minnesota

In recent years, the diagnosis and care of ligamentous injuries about the knee have received added emphasis because of the general publicity given to athletic injuries. The knee joint, because of its anatomic complexity, rapidly alternating motions, and frequent subjection to externally applied forces, is particularly susceptible to ligamentous strains and injuries. The demonstration by numerous surgeons that early comprehensive diagnosis and repair of injured structures often lead to complete rehabilitation, even to participants in competitive sports, has focused increasing emphasis on providing early definitive care.[1, 7, 8, 13, 14] Injuries of the knee often are sustained by the younger and more active individuals, who have a strong motivation to return to full activity and are unencumbered by disability-compensation considerations. Strong ligaments and supple, active muscles are decided assets in rehabilitative efforts.

Anatomic and Kinesiologic Considerations[2, 3, 5, 9-11]

The knee is a large superficial joint that lends itself to definitive examination. It is axiomatic that to evaluate the status of the ligamentous structures of the knee properly, a thorough understanding of the anatomy and the characteristics of motion is needed.

The rounded femoral condyles are stabilized on the flattened tibial condyles by static ligamentous and cartilaginous elements. These elements include the medial and lateral collateral ligaments, the cruciate ligaments in the intercondylar area, the posterior capsule and its ligamentous thickenings, and the menisci. These ligaments tend to hold the joint in close approximation during the full range of motion and to guide the conjugate rotation of the femur upon the tibial condyles. The active-stabilizing elements include the powerful quadriceps mechanism, the hamstring muscles, the two heads of the gastrocnemius muscle, and the popliteal muscle.

In flexion, the knee is stabilized by the taut anterior portion of the medial collateral ligament and by portions of the anterior and posterior cruciate ligaments. The latter by virtue of their twisted configuration are under partial tension during all phases of motion. During extension, the pulling of the quadriceps muscle on the tibial tubercle not only extends the knee but also produces a conjugate rotation that laterally rotates the tibia on the femoral condyles. Because of this, the medial femoral condyle slides through a greater arch than does the lateral femoral condyle. The menisci glide with the femoral condyles and, because of their peripheral attachments on the tibia, aid in establishing the path of the arc slide of the joint. Near the termination of extension, the fibular collateral ligament becomes taut and, together with the tethering action of the cruciate ligaments and the popliteal muscle, provides the fulcrum about which the final "screwing home" of the tibia is accomplished. This axis of rotation is through the lateral aspect of the medial femoral condyle. In complete extension, the joint is well stabilized by the posterior portion of the medial collateral ligament, which envelops the condyle in a hemispherical pouch.

Interference with this normal rotary motion of the tibia on the femur during flexion and extension gives rise to many of the meniscal and ligamentous injuries about the knee.

Types of Injury

Dislocation of the Patella.[4, 15] — Lateral dislocation of the patella generally occurs when the knee is in a flexed valgus, externally rotated position. The quadriceps mechanism contracting rapidly causes the patella to slide tan-

† Mayo Clinic and Mayo Foundation: Section of Orthopedic Surgery.
* Read at the meeting of the Sioux Valley Medical Society, Sioux City, Iowa, February 28, 1966.

gentially across the lateral femoral condyle. This injury is more likely to occur in young women, and there may be a hereditary disposition which should be sought for in the history. A complete dislocation may result in a shearing osteochondral fracture of the lateral femoral condyle or the medial patellar facet. When the patient is first seen, the dislocation or subluxation often will have already been reduced, and the patient often accurately describes the injury as a dislocation of the knee cap.

On examination, there is tenderness over the insertion of the quadriceps tendon on the anteromedial aspect of the capsule as well as over the rim of the lateral femoral condyle. A careful clinical and radiographic search for osteochondral fracture, including a tangential patellar view, is mandatory.

With the initial episode when no fracture is evident, a period of immobilization in a cylinder cast for 4 to 6 weeks followed by careful strengthening of the quadriceps and hamstring musculature by graded, progressive resistance exercise is warranted. Repeated dislocations or associated osteochondral fractures may require operative treatment.

Meniscal Injuries.[6, 7] — Meniscal injuries occur as isolated incidents or as concomitants of ligamentous disruptions. Meniscal disruption is the most common cause of traumatic effusion and hemarthrosis and, therefore, should be suspected in any injury of the knee. The medial meniscus is torn approximately five times as commonly as is the lateral meniscus. The meniscus may be torn in several ways, and the symptoms produced depend on the nature of the tear. Longitudinal tears may occur through the substance of the meniscus or through the peripheral attachment. In either case the entire meniscus, or a portion of it, may be displaced into the intercondylar notch and give rise to the so-called bucket-handle tear (Fig. 1). Displacement of this type is not likely to be retrieved from the intercondylar notch by manipulation or rest. A loss of extension and continuing discomfort in the knee should be suggestive of this injury. Occasionally, peripheral tear of the meniscal attachment from the capsule in the younger patient will heal with the immobilization. Pedunculated tears of the free edge of the miniscus give rise to a sensation of intermittent clicking and "giving way." Such a tear may be suspected in the posterior horn when the patient notices difficulty in arising from a kneeling or squatting position. Tears of the anterior horn are somewhat more common in the older patient and are associated with tenderness over the anteromedial joint space. Tears of the medial meniscus usually are related to blockage of normal conjugate rotation of the femur on the tibia, particularly with the foot fixed in external rotation. By clinically testing the knee with the foot held in fixed internal or external rotation during extension (as in the McMurray test) the cartilage may be felt to jump, slip, or evoke a painful sensation during extension.



Fig. 1. Bucket-handle tear of medial meniscus. The largest portion of cartilage is displaced into intercondylar notch with only a small rim of cartilage remaining at the peripheral attachment.

Effusion in the joint, tenderness along the medial joint line, lack of extension, and blockage of rotation are other common signs associated with meniscal injuries. A locked knee commonly signifies a bucket-handle tear, and most such patients require arthrotomy.

Tears of the Medial Collateral Ligament.[1, 13, 14] — The tibial collateral ligament is injured by forces that abduct the tibia on the femur, such as the common clipping injury in football, a forward fall between diverging skiis, or the bumper injuries of pedestrians (Fig. 2). Tear of the ligament may occur from its origin over the proximal aspect of the medial femoral condyle through its insertion on the tibial metaphysis 1½ inches distal to the joint line. Combinded rotatory and abduction stress, when severe, gives rise to a concomitant injury of the medial meniscus and anterior cruciate ligament, thus producing the so-called unhappy triad.

If the knee is to be examined immediately after injury, it is sometimes possible to demonstrate abnormal dimpling over the joint line by

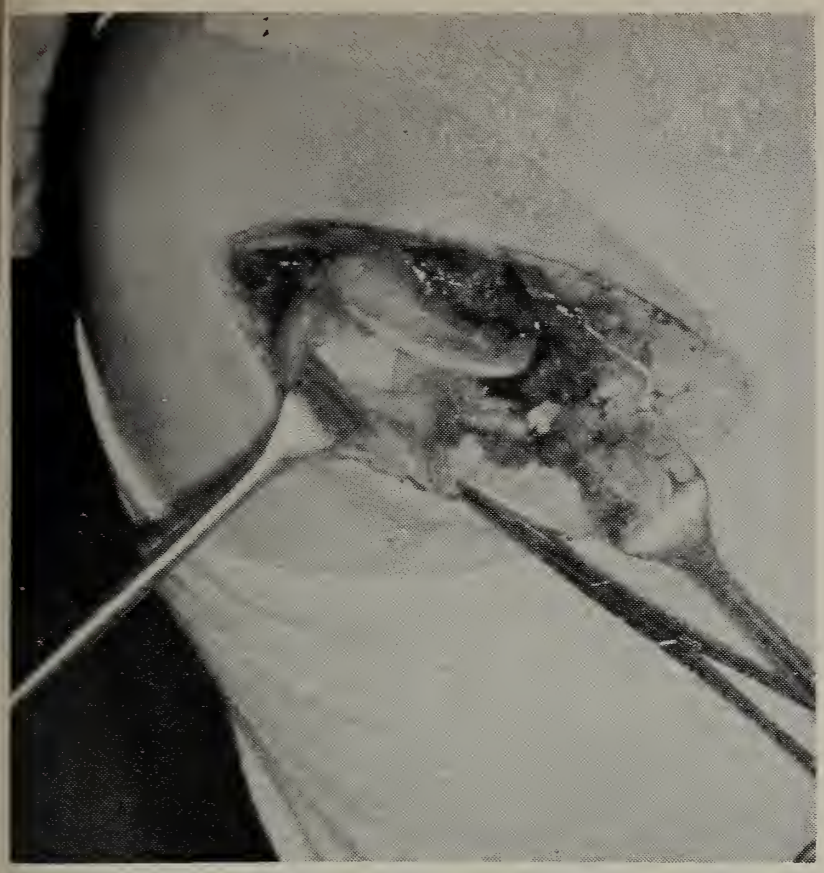


Fig. 2. Torn medial collateral ligament. The superficial portion of ligament with a grossly shredded appearance can be seen lying on posterior knee retractor. The deep portion of ligament has been torn from its attachment just above rim of the femoral condyle. The layers were repaired separately, with anatomic approximation. A small incomplete tear of the anterior cruciate ligament was present.

producing a valgus deformation. This is caused by the negative intra-articular pressure when the joint is "sprung open." This clearly signifies that the medial collateral ligament has been ruptured and that surgical repair will be necessary. Very early after injury, an actual defect in the ligament may be palpated, but later findings are tenderness and localized hematoma.

The anterior cruciate ligament is tested with the knee flexed and the examiner pulling the tibia directly forward. An injury to the ligament is signified by a greater forward slip than is noted in the sound, opposite knee. This is a positive anterior-drawer sign. When the knee is distended by hemarthrosis and protected by muscle spasm, it is difficult to elicit this sign or the other signs of serious ligamentous instability. In order to obtain an accurate diagnosis, aspiration of hemarthrosis and examination of the knee during anesthesia are justified.

Once ligamentous disruption is established, exploration of the knee with careful repair of the ligaments and excision of torn meniscal fragments should be undertaken. Procrastination in such circumstances has no logical validity.

Injuries to the Lateral Collateral Ligament.[1, 12] — Disruption of the lateral ligament is produced by adduction of the leg on the thigh. Because of the protective effect of the opposite leg, this injury is seen less commonly than is abduction injury. In addition to the adduction force, the foot is often trapped with the leg internally rotated on the femur. This blocks the normal rotatory movement of the knee and prevents any possible accommodation of the force on the knee through flexion. The fibular collateral ligament commonly ruptures at its distal insertion or avulses the fibular styloid



Fig. 3. Rupture of lateral collateral ligament. Complete rupture of lateral collateral ligament is obvious in this varus stress view. Biceps femoris, iliotibial tract, popliteus tendon, and occasionally the peroneal nerve may be injured concomitantly.

process (Fig. 3). In addition, the insertion of the popliteal muscle on the femoral condyle, the insertion of the biceps femoris, and the iliotibial tract may be torn. The free ends may be trapped in the joint. The cruciate ligaments may give way with increasing force. The most serious aspect of this injury is stretching of the common peroneal nerve. This nerve is firmly tethered about the fibular neck as it courses from the popliteal space to the anterior tibial com-

partment. Sudden traction force results in intraneural stretching or, at times, complete rupture of the nerve, both of which offer a poor prognosis for recovery.

Isolated Cruciate Ligament Injuries.[1, 7] — Cruciate ligaments because they are well protected in the intercondylar notch are less prone to isolated injury than they are to the more severe combined injuries just described. A direct force exerted against the knee or lower portion of the thigh may give rise to avulsion of the anterior tibial spine or to rupture of the anterior cruciate ligament as the femur is displaced posteriorly on the tibia. A similarly exerted force may cause disruption on the posterior cruciate ligament when the knee is hyperextended. In the severe injury the posterior capsule is ruptured and dislocation of the knee takes place. Disruption of the popliteal artery in such an instance presents a surgeon with a true emergency. Swelling of the popliteal space and absence of the pedal pulses should be considered a surgical emergency. Temporizing with vasodilating drugs, sympathetic blocks, or observation is frequently catastrophic. Exploration of the popliteal artery as soon as the diagnosis is suspected should be planned.

Comment and Conclusion

Experience by many authors, particularly those who are associated with a close supervision of athletic contestants, has shown that adequate diagnosis and surgical repair, when indicated, may return the patient with a severely injured knee to the stresses of competitive athletics. The knee is a particularly vulnerable joint, being subjected not only to considerable body weight but also to strong propulsive and rotatory stresses that are the prerequisites of athletic agility. For the infrequent examiner, determination of which knee is injured sufficiently to require reconstructive procedures or immobilization is difficult.

The presence of hemarthrosis or a history suggestive of violent injury to the knee indicates that not only should complete roentgenograms, including anteroposterior, lateral, notch, and tangential patellar views, be taken but also that the knee be examined exhaustively. This includes examination with anesthesia if uncertainty remains in the mind of the examiner. Since much more information will be gained by examination of the knee immediately after the accident, this opportunity, if present, should not be lost. Later, arrival at a correct diagnosis may be much more difficult. In instances in which no major ligamentous instability is noted, the application of a snug-fitting cylinder cast with the knee a few degrees short of complete extension may be applied for 3 to 6 weeks. The adequate instruction of the patient in progressive, resistance exercises after immobilization is a necessary part of adequate rehabilitation.

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I. DIFFERENTIAL STUDY OF CARDIOGENIC SYNCOPE WITH THE UTILIZATION OF RADIOTELEMETRY*

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Warren L. Jones, M.D.†
Clinical Associate Professor of Physiology
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Fellow of the South Dakota Heart Association

There is more than just an academic interest in identifying the cause of syncope before subjecting a patient to the implantation of an artificial internal pacemaker. Furthermore, there is some risk involved in pacemaker implantation, and there are a number of benign causes of syncope which can be treated very well medicinally or need no treatment whatsoever. Therefore, all physicians who might deal with this type of case should have a working basis upon which to judge the differential diagnosis of syncope.

Since episodes of cardiogenic (Stokes-Adams) syncope occur irregularly and without premonitory symptoms, it is difficult, if not impossible, to record an episode by ordinary electrocardiographic or cardiac monitoring equipment. Long term recording equipment or complicated play-back tape recording devices are needed. When the cause of syncope is not apparent on clinical grounds, radiotelemetry is a practical and effective method for recording and identifying the cause of syncope. The practical use of radiotelemetry for this purpose is the subject of this paper.

CAUSES OF SYNCOPE:

The practicing physician is often called upon to treat a patient who has lost consciousness. Usually the patient has regained consciousness when the physician arrives on the scene. Most of these patients need no treatment, but in some the need for diagnosis is most important, indeed lifesaving. Therefore, the physician is faced with the problem of differentiating the several varieties of syncope.[1] Shown in Table I is a list of causes of syncope, each of which should be considered in any patient presenting this problem.

TABLE #1

VARIOUS CAUSES OF SYNCOPE

1. Chronic orthostatic hypotension.
2. Vasodepressor syncope.
3. Adams-Stokes syncope.
4. Carotid sinus syncope.
5. Organic heart disease.
6. Hyperventilation syndrome.
7. Cough syncope.
8. "Fainting lark."
9. Micturation syncope.
10. Hysterical fainting.
11. Cerebral arterial occlusive disease.
12. Hypoglycemia.

By procuring a careful history of the circumstances and symptoms preceding the bout of syncope and any past history of similar spells, inquiry regarding past medical illnesses, and performance of a complete physical examination, the physician will be able to eliminate some of the causative mechanisms.

For instance, syncope occuring in a diabetic should be considered due to hypoglycemia, or to cerebral arterial disease, in addition to the possibility of a cardiogenic cause. The syncope that may occur in hyperventilation syndrome is preceded by a considerable period of anxiety and dyspnea. When there is preceding giddiness and faintness for a minute or so before the loss of consciousness, one is dealing with vasodepressor syncope in the great majority of cases, and since there are no premonitory symptoms preceding cardiogenic syncope, this cause is easily eliminated from the list of diagnostic possibilities. The patient with orthostatic syncope similarly will have preceding faintness, and the syncope would be reproducible, or an abnormal drop in the blood pressure recorded on assuming the standing from the recumbent position. The hysterical patient is easily identified by a careful history and examination, but should this pose a differential diagnostic prob-

* This investigation was supported in part by the South Dakota Heart Association and by Public Health Service Research Grant HE-09234-02 (CV) from the National Institute of Health.
† University of South Dakota Medical School, Vermillion, South Dakota.

lem the use of radiotelemetry would be of a great help. The syncope occurring in relation to a cerebral arterial insult will be followed by residual neurological abnormalities which may be transient or prolonged. Moreover, there is a period of mental cloudiness or amnesia which follows the syncope. Similarly, there is a postictal amnesia and preceding aura in the case of an epileptic seizure. The several remaining types of syncope unrelated to the heart can be identified by the repetitious and consistent act-syncope relationship such as micturition and cough syncope.

In the case of the arteriosclerotic patient with hypersensitive carotid sinus syndrome, the slowing of the heart rate or drop in blood pressure is reproducible by carotid sinus massage. This type of syncope is readily controlled medicinally, and would not warrant pacemaker implantation. When one finds evidence of aortic valvular heart disease, and particularly aortic stenosis, one must strongly consider cardiogenic syncope. When the patient has obvious advanced heart disease, and particularly when any rhythm or conduction disturbance co-exists, cardiogenic syncope is a primary consideration. When a complete heart block is present, the patient should be considered a likely candidate for syncope, even when no previous history of loss of consciousness can be found. Furthermore, the patient with a complete heart block and peripherally located idioventricular pacemaker, when under stress, such as a surgical procedure, is a vulnerable candidate for cardiogenic syncope and sudden death. Under these circumstances, prophylactic temporary artificial pacing of the heart should be carried out prior to, during, and for several days following the operative procedure.

THE MECHANISM OF SYNCOPE:

There are several mechanisms that may cause syncope, each produced by an interference with intracellular metabolism of the brain cell. Some examples are: 1. Hypoxia of the brain cell which occurs in the presence of hyperventilation syndrome with the production of respiratory alkalosis which causes a change from the normal oxygen dissociation curve. This change makes it more difficult for hemoglobin to release oxygen to the tissue cells, thus producing a cellular hypoxia. 2. Localized brain cell hypoxia occurs when there is reduced flow, or cessation of flow through a cerebral artery or one of its branches, such as might occur in arterial thrombosis. If the hypoxic cells subserve the state of consciousness of the organism, syncope may occur. Similarly, in the presence of cerebral hemorrhage and the accompanying increased pressure compressing the brain tissues, syncope often occurs, due to hypoxia. 3. The syncope which is due to hypoglycemia is due directly to the reduced availability of glucose for the cerebral cells which are very sensitive to glucose lack. The mental torpor and subsequent coma due to diabetic acidosis, on the other hand, is due to the degree of acidosis interfering with metabolic activities within the brain cells. 4. The mechanism of cardiogenic syncope is related directly to failure of the heart to maintain cerebral blood flow, and will be further discussed below.

The cells of the central nervous system are very sensitive to hypoxia, and for this reason the cerebral circulation is jealously maintained. during states of hypotension, at the expense of most other tissues of the body. Cerebral cell hypoxia may occur in varying degrees depending upon the degree of reduction in cerebral blood flow, and the amount of hypoxia, and the duration of these deficiencies. Should the cerebral blood flow cease altogether, within a matter of seconds, depending on the previous status of the circulation, the patient will develop mental clouding followed by loss of consciousness, followed soon by convulsive activity and shortly by a generalized convulsive seizure. If the cerebral circulation recovers within 3 to 4 minutes, the patient will regain consciousness and rapid cerebral functional recovery follows. Conversely, if recovery of the cerebral circulation is delayed approximately 4 to 8 minutes, increasing degrees of permanent cerebral functional loss will occur; whereas other tissues of the body may recover. Beyond 6 to 8 minutes, the cells of the vital centers become irreversibly injured, and death of the whole organism occurs. The response of the brain, therefore, and its relation to blood perfusion, oxygen supply, and time are of the utmost importance in the ultimate outcome of any episode of syncope.

In cardiogenic syncope, the cerebral blood flow decreases with some of the rapid rhythm disturbances, such as ventricular tachycardia, and stops altogether with the onset of ventricular fibrillation. Similarly, the circulation may stop on the basis of cardiac standstill (or ventricular standstill). For many years, the latter mechanism was referred to as Stokes-Adams syncope. Both mechanisms are now collectively known as causes of "cardiogenic syncope."

On giving thought to these basic mechanisms, the clinical picture of cardiogenic syncope be-

comes more apparent. Characteristically, there is sudden onset of faintness, loss of consciousness, with or without convulsive activity, and with no premonitory warning symptoms. Recovery following the episode is rapid and complete, unless the duration is 3 or 4 minutes or longer. The differentiation of cardiogenic syncope from the other varieties of syncope will be made clinically with greater accuracy by keeping these facts in mind.

In those cases in whom the physician cannot make this differentiation, or in whom he does not have the opportunity to observe the syncopal episode, it may be imperative to use long-term cardiac monitoring in hope of tracing an episode on the monitor system. Since the syncopal episodes occur so irregularly and without warning, it becomes necessary to have a long-term recording system so that after an episode has occurred one may go back and see a permanent ECG record traced during the spell. This then, provides the physician with identification of the mechanism of the episode of syncope. The use of the radiotelemetric method of monitoring and taping the ECG is a means of accomplishing this task.

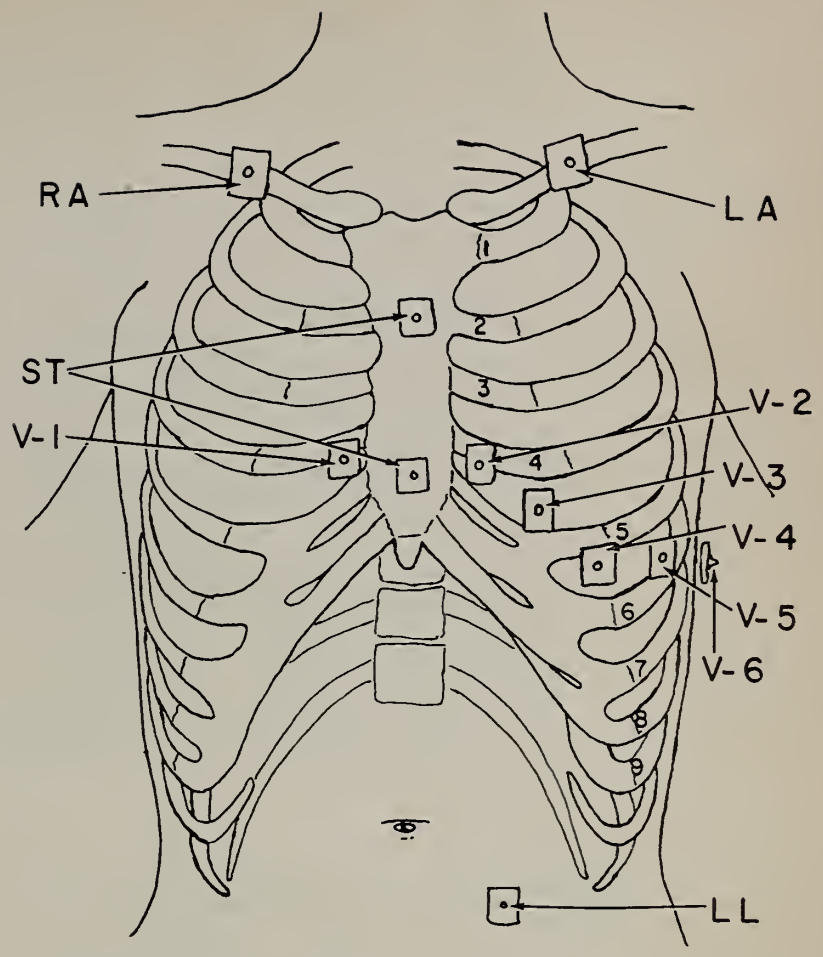


FIGURE 1. Shows the location of the electrodes in relation to fixed position of the thorax for radiotelemetry: RA-right arm; LA-left arm; LL-left leg; V_1-V_6 orthodox chest V leads; ST-sternal leads for severe exercise.

RADIOELECTROCARDIOGRAPHY

Obtaining electrocardiograms without the use of connecting wires between the subject and the recorder is not a new field. Holter and Gengerelli (1949)[2] were among the first to report the use of a radio broadcasting device in the transmission of physiological data. By 1952 Glasscock and Holter[3] had reported clinical studies in progress with this device. In 1954 Barr[4] reported the use of radiotelemetry as a part of a study of stress in military aviation medicine. Since these early reports, the size of the equipment has decreased and various refinements have been introduced, but the basic concept of a radiotransmitter and a special radio receiver has remained unchanged.

The elimination of the cumbersome connecting wires between the subject and the electrocardiographic recorder and the new adhesive electrodes have opened new areas of investigation of cardiac activity. The radioelectrocardiogram (RECG) may be continuously recorded from the orthodox limb, augmented limb, or chest leads for activity levels ranging from complete rest to moderate exercise. In more severe exercise, such as swimming or treadmill exercise, a sternal electrode placement is preferred. While this does not yield a standard ECG it permits the observation of cardiac function, during these tests, for abnormalities which would dictate cessation of the tests (See Figure 1).

Thus cardiac activity may be observed under a variety of conditions from complete bed rest to the most strenuous of cardiovascular function tests. This range of observations would provide for a more realistic ECG evaluation than those in which the subject lies quietly in the electrocardiography laboratory. This is not to say, however, that the orthodox office equipment is no longer useful in a majority of the routine cardiac examinations. Radioelectrocardiography merely offers an extension of these observations. This is especially true when the cardiovascular function tests are utilized. It has been observed that the diagnostic signs of cardiac ischemia or other abnormalities may occur during or immediately following the test and may return to normal before the subject is recumbent, and the orthodox office equipment is reconnected.

Criscitiello and O'Rourke (1965)[5] have presented a study in the detection of cardiac arrhythmias. These authors have documented the need of constant cardiac monitoring in a variety of cases ranging from Stokes-Adams syndrome to myocardial infarction. The utilization of a radiotelemetry system would be of great technical advantage in most of the cases presented.

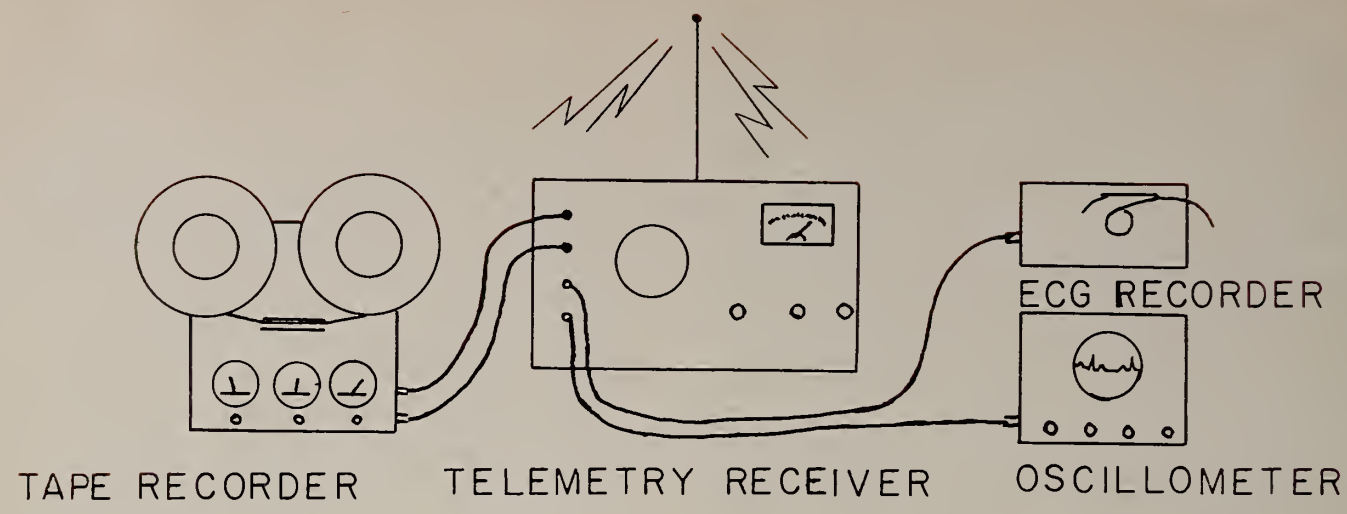


FIGURE 2. Depicts a variety of experimental and clinical uses for radiotelemetry.

While there are numerous RECG systems available commercially our system consists of the following (See Figure 3): a Telemedics RKG 100a miniaturized transmitter and receiving system, Telemedics 3 inch oscilloscope, Sanborn Viso-Cadette paper recorder, and an Ampex SP-300 7 channel magnetic tape recorder. With this system the RECG may be monitored on the oscilloscope, printed out on the paper recorder or continuously recorded for 10 hours on each channel of the magnetic tape recorder. All or any combination of the above is possible with the added feature that the previously recorded events may be replayed for any prior period of time. In this manner one can observe the events preceding an episode of syncope as well as during and after the episode. Thus the origin of the precipitating factor or factors may be determined as well as the type of syncope experienced and the recovery process.

In our experience in various hospitals the receiving, recording and monitoring equipment may be located at a central nursing station. Signals from the subject may be received for distances up to 500 feet away depending upon the construction of the building. Thus the patient may be in bed or allowed the freedom of his room or floor and still be under the supervision of the nursing station.

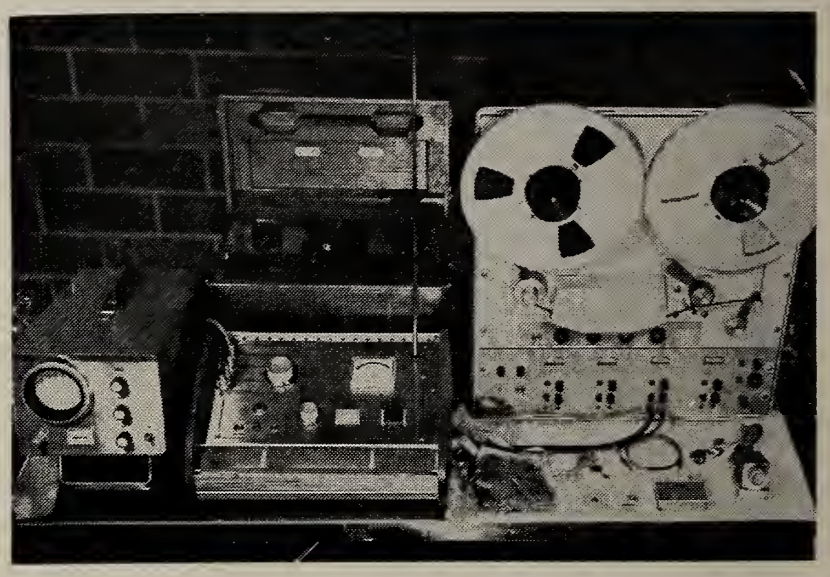


FIGURE 3. Shows the equipment utilized in this study — Radiotelemetry transmitter and receiver, FM magnetic tape recorder, oscilloscope and paper recorder.

In 1965 the South Dakota Heart Association initiated this differential study of cardiogenic syncope with the aid of equipment borrowed from USPHS grant NIH 09234-02 (CV). In this

study we attempted to utilize radiotelemetry as a diagnostic aid.

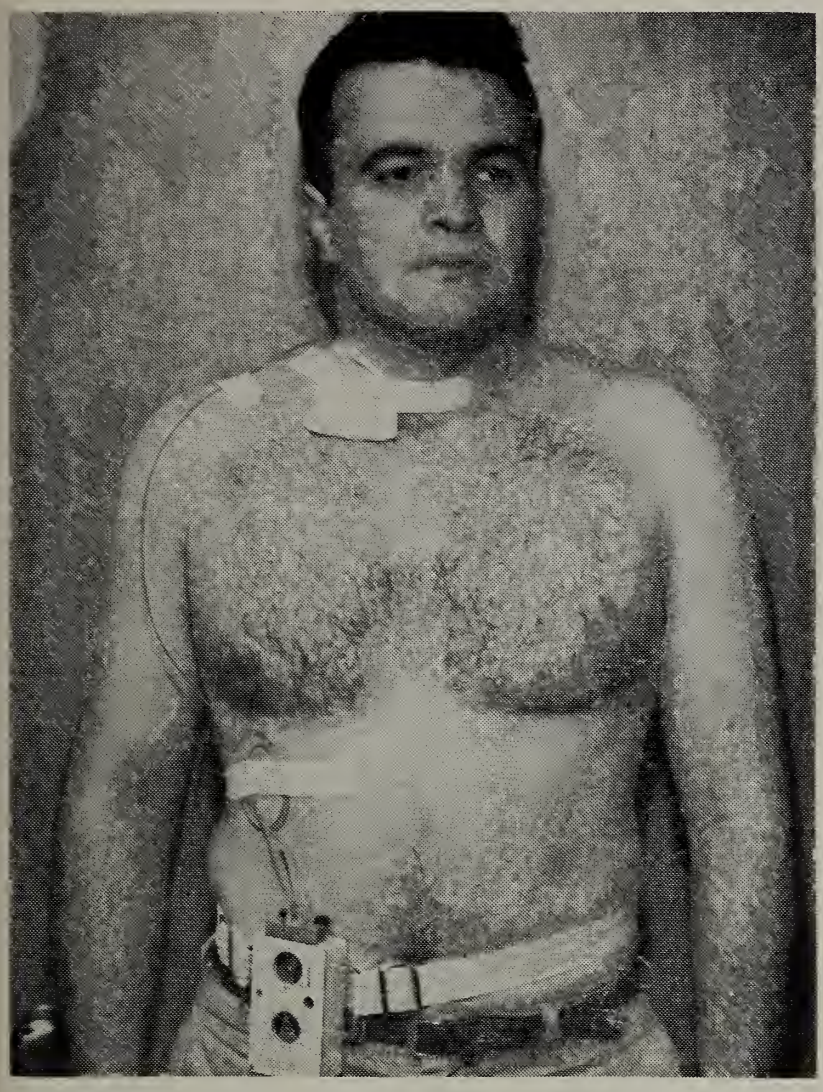


FIGURE 4A. Shows the positioning of the Chardock intravenous catheter and medtronic Pacemaker.

In addition to the equipment mentioned, an emergency temporary transvenous catheter (Chardock Model 5821-C) pacemaker (Medtronic Model 5000) is available for immediate use by the attending physician or a member of the



FIGURE 4B. Shows the equipment (Medtronic Pacemaker and Chardock intravenous catheter).

study team. Emergency temporary pacemaking is the topic of the accompanying paper and will not be discussed in detail here.

SUMMARY

The causes of syncope as well as the several possible mechanisms of syncope have been discussed. In the differentiation of cardiogenic syncope, long term cardiac monitoring by use of radiotelemetry has been advocated.

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"A STORK'S-EYE VIEW OF MEDICARE"

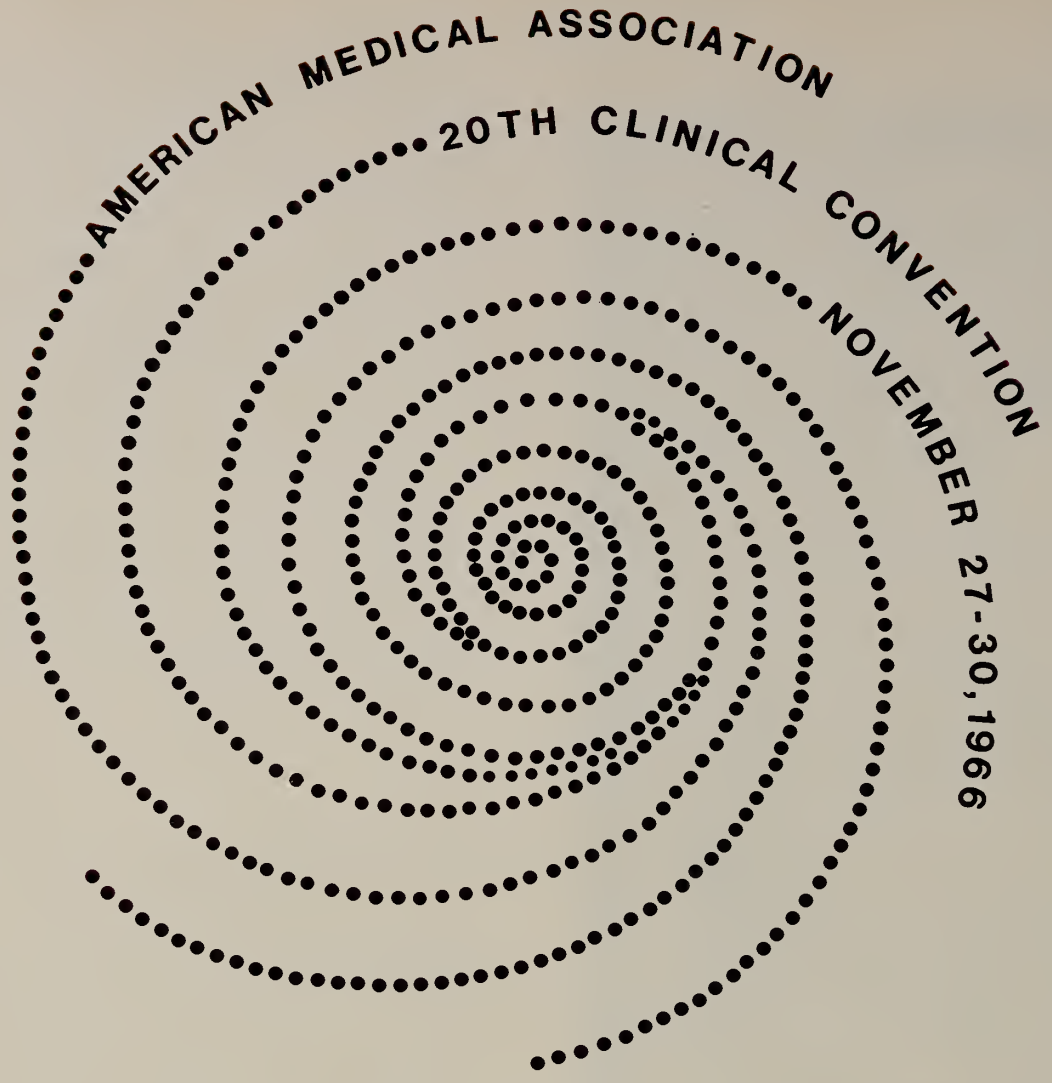
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"What does it say, dear?" asked the wife.

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II. THE APPLICATION OF ARTIFICIAL CARDIAC PACEMAKING IN THE COMMUNITY HOSPITAL*

Warren L. Jones, M.D.†
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Joseph D. Welty, Ph.D.†
Assistant Professor of Physiology
Robert Raszkowski, M.A.†
Fellow of the South Dakota Heart Association

With the development of reliable electronic methods and equipment, the treatment of patients with complete heart block and cardiogenic syncope has entered a new era, and is rapidly finding its place in cardiac therapy. Although the use of certain drugs for cardiac resuscitation and for preventive therapy is still important, indeed indispensable, their use is not always effective or reliable.[1, 2]

During the experimental phase in the development of cardiac pacemakers, roughly the period 1960 through 1964, considerable lay and medical publicity took place, some of which referred especially to areas of defect and failure. These reports have caused some physicians to be reluctant to accept this new method of treatment. Wire breakage and battery failure have now been largely overcome, so that equipment is now available which can be relied upon for from 15 to 30 months, usually with a recognizable warning period.[3] Thus, this reluctance is no longer justifiable.

The average practicing physician over the years has so adjusted his attitude toward sudden death in cardiac patients as to accept this as being inevitable. Now it is time to re-evaluate this attitude, for some of these patients can be salvaged — not just to postpone death but to retrieve a longer period of productive living. Even more important is that some of these patients have only a temporary need for artificial pacing, such as during the acute and convalescent phases of acute myocardial infarction, when complicated by complete heart block, with subsequent return of normal sinus pacemaker function and complete recovery. Therefore this attitude of the physician is in need of new adjustment.

The occurrence of complete heart block and its complications is rapidly increasing, for several reasons: There are more people living to reach the age of greater incidence of ischemic heart disease; and methods of diagnosis are now more available and more extensively used. Physicians generally are now more informed regarding the disturbed physiology, diagnosis and treatment in this area of heart disease.

We believe that some patients who would benefit by artificial cardiac pacemaking are being overlooked, and others die because drug therapy has failed or the attending physician has procrastinated too long. The purpose of this paper is to promote an understanding of this method of treatment, and discuss the indications for artificial cardiac pacemaking and the technics of application. In the accompanying paper patient selection has been stressed, and diagnostic methods in case finding are outlined.

INDICATIONS FOR CARDIAC PACEMAKING:

Although the full scope of application of the artificial cardiac pacemaker is not yet realized, those situations outlined in Figure #1 provide a working basis on which to judge the indications of this procedure. Moreover, the need for a cardiac pacemaker may be short-term, and a

Figure #1

INDICATIONS FOR USE OF AN ARTIFICIAL PACEMAKER

1. Recurrent bouts of cardiogenic syncope.
2. Intractable heart failure with complete heart block or severe bradycardia.
3. In anticipation of stress in a patient with complete heart block.
4. In patients with ventricular arrhythmias poorly controlled with drug therapy.

* This investigation was supported in part by the South Dakota Heart Association and by Public Health Service Grant HE09234-02 (CV) from the National Institute of Health.
† From the Department of Physiology, the University of South Dakota School of Medicine, Vermillion, South Dakota.

temporary pacemaker used; or the need may be indefinite calling for a permanent implantable pacemaker.

The patient with recurrent bouts of cardiac standstill or ventricular fibrillation which are not alleviated by drug therapy is in urgent need of artificial pacemaking. These types of cardiogenic syncope usually require long-term pacing, but initially a temporary catheter (transvenous) pacemaker is employed to overcome the precarious (ominous) episodes of syncope and later an implantable pacemaker can be applied as an elective procedure while the temporary pacemaker has capture of the cardiac rhythm. Indeed, the insertion of a catheter pacemaker is often an emergency and life-saving procedure, which may not await transfer of the patient and risk of further episodes of syncope, any one of which may be fatal. The reader is referred to the accompanying paper in which the use of radiotelemetry in identifying patients for pacemaking is discussed.

In some patients, usually with advanced underlying heart disease, in whom frequent premature ventricular beats and recurrent bouts of ventricular tachycardia are not satisfactorily controlled with Quinidine or procaineamide, a temporary cardiac pacemaker should be employed. As a rule, when ventricular capture is obtained, and the rate of the artificial pacemaker set between 70 and 80 beats per minute, the ventricular ectopic focus can be "overcome" and the ventricular rate controlled. As shown by Heiman and Helwig,[4] artificial rates of 100 to 130 per minute are sometimes needed to suppress a ventricular arrhythmia. This use for artificial cardiac pacemaking is being reported more frequently in the medical literature.

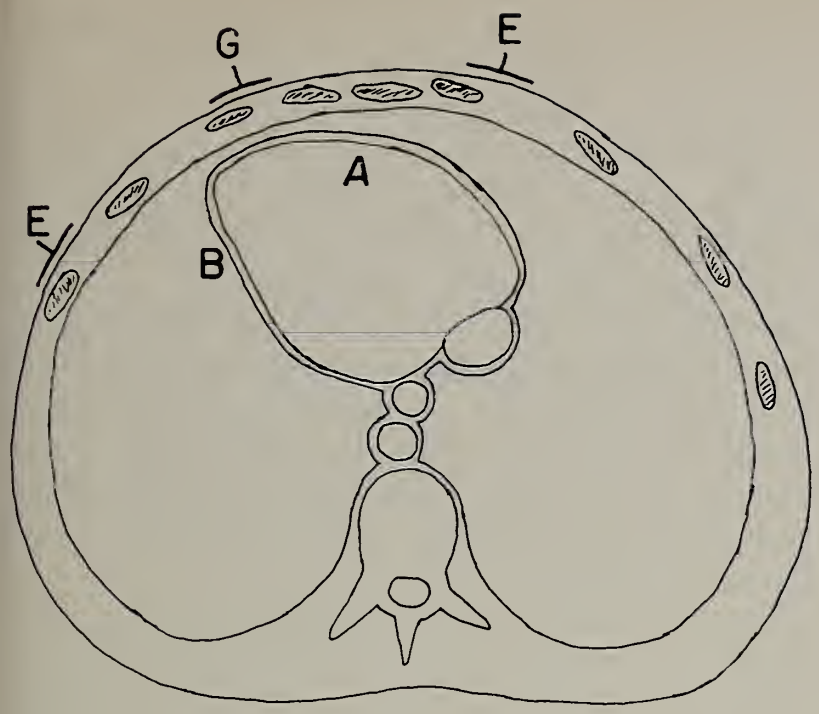
Complete heart block is seen only occasionally in medical practice, and when seen by the physician, the patient may be free of symptoms and in no need of help. More commonly, however, the older patient with a complete heart block is in congestive heart failure, or subject to adverse rhythm disturbance, usually with a large heart, and with only temporary, or incomplete control of the congestive heart failure. Drug therapy used to increase the rate of impulse formation in the idioventricular pacemaker is of limited help. The more peripherally the idioventricular pacemaker is located in the ventricular muscle, the slower the ventricular rate (20 to 40 beats per minute). In this type of case, if the ventricular rate can be increased from say 30 to 60 beats per minute, the minute cardiac output can be appreciably increased, possibly doubled. Therefore, the application of artificial cardiac pacemaking in this type of patient is often the only means of controlling the congestive heart failure, and giving him opportunity for useful living.[5]

When any patient with a complete heart block is faced with stress of any sort (surgical, emotional, injury, acute illness) the likelihood of cardiogenic syncope is increased many fold. Therefore, if one can anticipate stress in such a patient, the use of a temporary artificial pacemaker may avert a fatal bout of syncope. This indication for cardiac pacemaking is exemplified by the elderly patient with a complete heart block found to have carcinoma of the rectum and in need of major surgery, reported by Kimball, et al.[6]

In the development of an acute myocardial infarction the A-V conduction pathway may be injured temporarily or permanently, jeopardizing the welfare of the patient. Similarly, an irritable ventricular ectopic focus, under these circumstances, may endanger the patient, and may not be controllable with drug therapy. In any of these instances, the use of the artificial cardiac pacemaker is indicated; and its use may be for only a limited period of time, or long-term use, depending on the individual situation at hand.

THE EXTERNAL CARDIAC PACEMAKER:

The external cardiac pacemaker has been in use since 1952 (Zoll[7]) and utilizes a relatively large current (50 to 150 volts, 50 to 200 ma, with a duration of 2-3 m sec.) as compared with the internal pacemaker (1 to 10 volts, 2 to 3 ma, at a duration of 1-3 m sec.).[3] The electrodes are applied to the skin overlying the precordium, using ECG paste to overcome the skin resistance. The electrical impulse employed by the external pacemaker is painful to the patient, and his tolerance is usually exceeded within a few minutes. This limits the usefulness of the external pacemaker to its present status, as a means of emergency cardiac resuscitation. Also, because it is not always reliable in its capacity to stimulate the myocardium to contract, it has further limitation in use. Nevertheless, the external pacemaker is still relied upon as a piece of equipment necessary in an emergency room, or intensive care unit, for emergency resuscitation. Figure ♯2 is a cross-section illustration of the thorax which will give the reader a relative concept of the distance between the electrodes (E, E) and the small area of ventricular muscle in line of fire, and the tissues traversed by the



EXTERNAL PACEMAKER

Figure 2: Cross-section of thorax, showing the location of the external electrodes (E, E) and ground (G) in relation to the heart. A transvenous catheter pacemaker electrode would stimulate the endocardial surface (A), and an implanted pacemaker electrode would stimulate the epicardial muscle (B) both using a much smaller voltage.

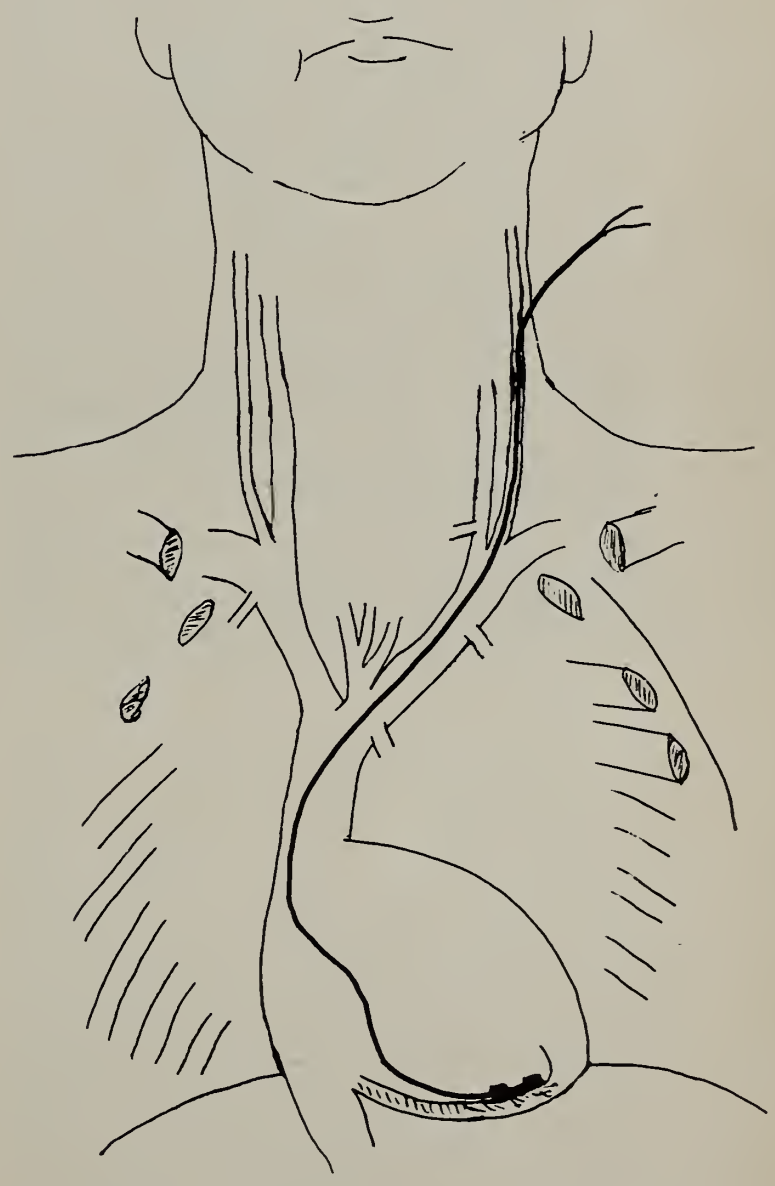
electrical discharge. These factors account for the large voltage requirement and the possibility of failure of response.

THE INTERNAL CARDIAC PACEMAKERS:

1. The temporary pacemaker: The temporary (catheter) pacemaker is simply a venous catheter containing two electrode wires encased in a silicone sheath at the tip of which are two closely situated metal electrodes. (See Figure #3) When inserted through a vein (preferably the external jugular vein) and into the right ventricle these metal electrodes come into close proximity to the endocardium, if not into direct contact. This is termed "capture," and is known to exist when the pulse-generator is attached to the external portion of the catheter and the artificial pacemaker "takes over" the pacemaking function of the heart. The "capture" is maintained by careful fixation of the catheter to the vein at the point of insertion, and to the skin surface as well. Motion of the head and neck will cause very little (if any) change in position of the metal electrodes; whereas, if any other vein were used, the site of insertion would have to be immobilized in order to maintain "capture."

Interestingly enough, one would think that anticoagulant therapy would be required, but this has not been the case. The site of entrance of the catheter through the skin, however, is a potential source of infection, and must be protected accordingly. Nonetheless, bacteria will ultimately gain entrance, and this is the principal reason why this method has limited long term use. The catheter pacemaker can be employed with reasonable safety for 10 to 12 days, beyond which time the possibility of wound infection and bacteremia arises rapidly. At the time when the catheter pacemaker is withdrawn, the need for an artificial pacemaker may no longer exist, or the temporary pacemaker should be replaced by a permanent (implantable) pacemaker. Thus, with a temporary pacemaker in place, there is ample time to safely transfer the patient to another hospital for further evaluation, and, if deemed necessary, to prepare for surgical implantation of a permanent pacemaker.

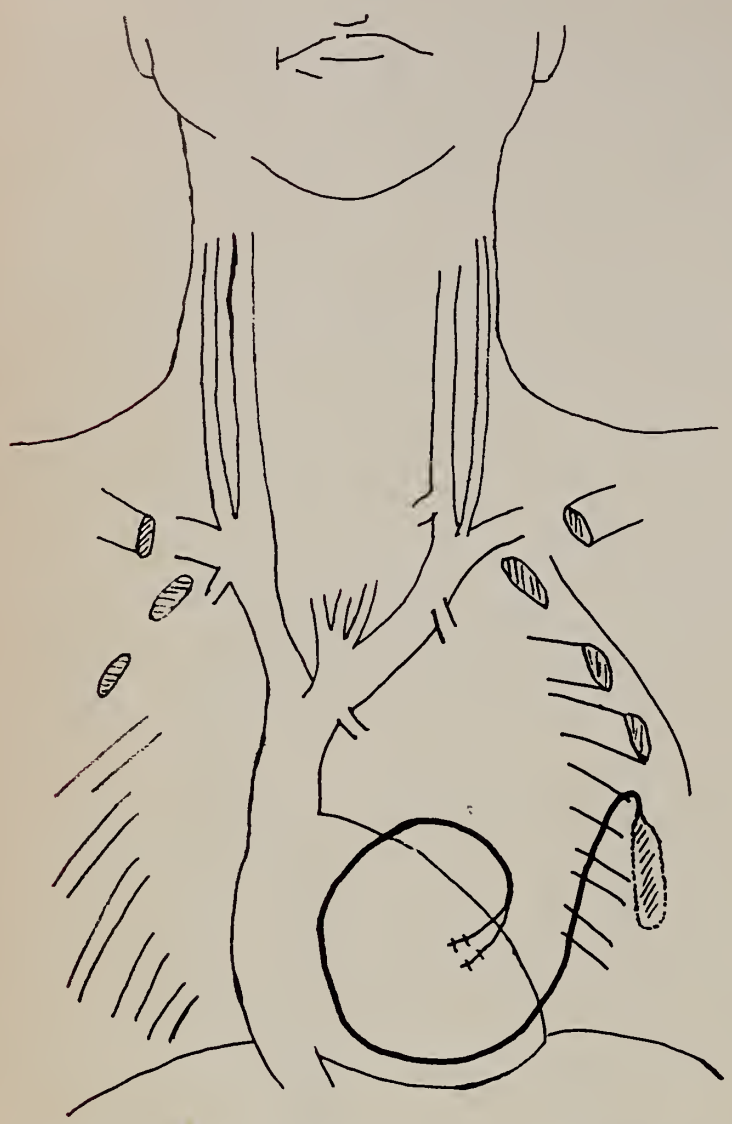
2. The Permanent Pacemakers: There are two varieties of permanent implantable pacemakers: a) the pacemaker whose electrodes are im-



CATHETER PACEMAKER

Figure 3: Shows a transvenous catheter pacemaker in place, with the electrodes in contact with the right ventricular endocardium, and the external wires ready to be connected to a pulse-generator worn externally.

planted into the epicardial surface of the left ventricle through a thoracotomy approach, (illustrated in Figure #4) and the pulse-generator



IMPLANTED EPICARDIAL PACEMAKER

Figure #4: Shows a permanent (transthoracic) pacemaker with the electrodes imbedded into the epicardial muscle of the left ventricle, and the pulse-generator implanted in the left axilla outside the rib cage.

implanted into the subcutaneous tissues of the left axilla, the pectoral region, or the anterior abdominal wall. And, b) the implantable (catheter) pacemaker, in which the catheter electrodes are inserted transvenously in the same fashion as the temporary catheter pacemaker, and the pulse generator implanted in the subcutaneous tissues of the right axilla, or beneath the pectoral muscles. This latter method is usually employed to obviate the need for thoracotomy, and is reserved for the very poor risk patient, such as that reported by Reade.[8] The catheter must be left in place indefinitely, for within a few weeks the electrode tip becomes permanently imbedded into the endocardial portion of the right ventricle and cannot be withdrawn. Indeed, if too much pressure is used to hold the "capture," the electrode tip may eventually penetrate through the right ventricular wall.[9]

The most desirable method of permanent pacemaking is the surgically implanted (thoracotomy) apparatus mentioned above (a). Before such a pacemaker were implanted, however, the patient's heart should be paced with a temporary (catheter) pacemaker, allowing time to get the patient into a satisfactory and stable condition before thoracotomy, and protecting the patient during the surgical approach to the heart when cardiogenic syncope would be more likely to occur.

There is quite a variety of implantable pacemakers available today, most of which are reliable. The battery failure and wire-breakage problems which were reported two and three years ago have now been largely overcome, and more easily recognized. A change in rate of the previously paced heart is now recognized as a sign of pacemaker failure; a gradual increase in rate indicating battery failure and a sudden decrease in rate (return to the idioventricular pacemaker), or cardiac standstill, meaning probable wire breakage. ECG alterations, and an x-ray view of the implanted pulse generator are additional means of assessing the life of the mercury batteries in the implanted pulse-generator. The basic principles involved with any of the newer implantable pacemakers are similar. Some can be adjusted in amperage and rate with a subcutaneous needle, and others can be changed in rate by passing a magnet over the skin overlying the pulse-generator, and other lesser conveniences tend to distinguish one make from another. The ultimate pacemaker of the future will probably receive a stimulus from the S-A node or atrial muscle which will excite (or inhibit) the pacemaker impulse release from the pulse-generator stimulating ventricular systole, thus attempting to coordinate the atrial and ventricular contractions in a normal sequence. It has been amply shown that atrial systole immediately preceding ventricular systole substantially increases the ventricular stroke volume, which is especially desirable in the patient whose cardiac reserve has been compromised by disease.[10]

THE EMPLOY OF A MEDICAL TEAM:

When faced with the urgent need for insertion of the temporary (catheter) pacemaker, the wise physician will call for the help of several of his colleagues. It is enough for one physician to handle each of the following responsible tasks: 1) one person for the surgical cut-down of the

vein to be catheterized, and help with stabilization of the vein, and maintenance of sterile technic; 2) one person available to watch the patient's vital functions, such as air-ways, the ECG monitor, and defibrillation whenever the need arises; 3) one person experienced in the operation of x-ray equipment and interpretation, to watch the catheter tip as it is being inserted, and to guide the physician who is inserting the catheter; 4) and one person to maintain sterile technic, and handle the catheter electrode, and insert the catheter. It is enough that each of these tasks are carried out by separate persons for the sake of constant observation of the patient, maintenance of sterile technic, and proper adaptation of the eyes for x-ray interpretation if an image intensifier is not available. In addition it will be necessary to have at least two nurses present to administer medicines when directed, and to procure additional equipment when needed.

As can readily be seen, the physician team is of greater importance than the actual setting of the procedure. The need for x-ray guidance is desirable and is available in any hospital. The surgical equipment needed is available in any hospital. The ECG machine can be used for continuous monitoring of the heart, and a defibrillator is available in any present-day hospital. Therefore, rather than risking death of the patient in transportation when frequent bouts of cardiogenic syncope are occurring, calling in the physicians might be safer and reasonably practical.

SERVICES AVAILABLE FOR PHYSICIANS IN THIS AREA:

Out of the Department of Physiology, the University of South Dakota, help can be obtained in the identification and management of the patient considered in need of a pacemaker. Other physicians in the area have similarly availed themselves to complete the working team; and its function has been successfully tested. The use of radiotelemetry has been discussed in detail in an accompanying paper. The temporary (catheter) pacemaker is included in the equipment available for transport to outlying medical facilities for use under circumstances discussed in these papers. No charge for these services has been made to the patient. However, purchase of permanent (implantable) pacemakers cannot be obtained by this means, nor are the charges for hospitalization or surgeon's fees absorbed by this research grant. The prevailing Medicare law will ease the expenses for most patients in need of artificial cardiac pacemaking today.

DISCUSSION:

Although, a relatively new method of treatment of the cardiac patient, the use of the artificial internal pacemaker has gained an acceptable place in the armamentarium of the cardiologist. The full potential use of this method is not yet realized — but it is predicted that there is considerably more need for pacemakers than presently used. In fact, at the present time in one hospital in New York City,[11] a temporary catheter pacemaker is being inserted transvenously in all patients with complicated acute myocardial infarction placed in a special coronary care unit. The pulse-generator is ready to turn on at a moment's notice. The catheter pacemaker is kept in place for four or five days, or longer if necessary, and withdrawn when the danger of cardiogenic syncope has passed. Such a radical means to control or avert cardiogenic syncope in the presence of an acute myocardial infarction seems justified for several reasons: 1) Any one episode of cardiogenic syncope may be fatal; 2) the venous cutdown and insertion of a catheter pacemaker require at least 10-15 minutes in experienced hands; 3) there is no great danger to the patient in inserting a catheter pacemaker for a limited number of days.

It is likely that any patient with complete heart block should have temporary cardiac pacing before and during any stressful period, for the incidence of cardiogenic syncope and sudden death is then appreciably higher.

Since the patient with a complete heart block is likely to have cardiogenic syncope, and since the first episode may be fatal, the time is near when any patient with a permanent complete heart block will be considered a likely candidate for pacemaker implantation, whether or not he has had episodes of cardiogenic syncope.

Since the number of elderly people is progressively increasing, as is the incidence of ischemic heart disease, the number of people in need of permanent cardiac pacemaking will increase proportionately.

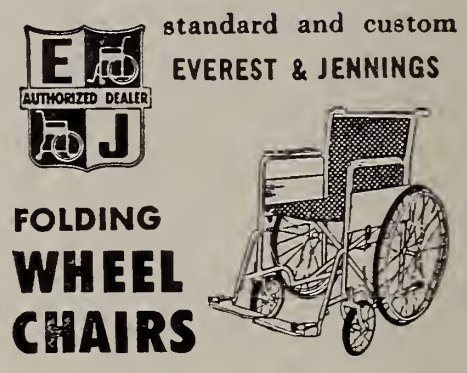
Therefore, the use of this new method of cardiac therapy should be known to all physicians, and its application learned by all physicians dealing with patients with cardiovascular diseases. A new attitude toward this method of treatment, and patients in need of cardiac pacing, is in order.

SUMMARY AND CONCLUSIONS:

A new method of treatment of certain types of heart disease has been discussed. A need for discarding old attitudes, and development of new enthusiasm toward the patient with complete heart block and cardiogenic syncope is urged. The method of application of cardiac pacemaking is discussed generally, and selection of patients for pacemaking is discussed in a companion paper. A means by which a "medical team" can be called to a community hospital to help identify patients in need of cardiac pacing, and application of the temporary catheter pacemaker under emergency circumstances has been related. The need for cardiac pacemaking will increase progressively, for reasons stated.

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THE ROLE OF CONGRESS AND THE PHYSICIAN IN MEETING HEALTH NEEDS*

By

Senator George McGovern (D-SD)

It is a pleasure to be with you in Huron today for this important annual meeting.

In his Health and Education Message to the Congress on March first of this year, President Johnson said: "A nation's greatness is measured by its concern for the health and welfare of its people. Throughout the history of our democracy, this commitment has grown and deepened . . . The health of our people is essential to the pursuit of happiness."

I can report to you today that at no time in our history has the Congress evidenced greater interest in meeting the health needs of our citizens.

During the past three sessions, Congress has enacted twenty landmark health measures and has doubled the appropriations for programs in the field of health. By the end of June, the Government will have invested, through the Department of Health, Education and Welfare, more than $3 billion in health. This Federal participation — representing a 50% increase in only three years — has stimulated parallel increases in State and private efforts. It has led to new breakthroughs in research, accelerated the attack on disease, and helped to bring better health care within the reach of millions of Americans.

Among some of the more important health measures enacted last year during the first session of the 89th Congress were:

* Maternal and Child Health Amendments, providing grants to institutions of higher learning for training professional personnel for health care for crippled, mentally retarded, and other handicapped children and grants to assist the States in implementing plans for treatment of the mentally retarded.

* Health Research Facilities Amendments of 1965, extending for three years the Health Research Facilities Construction program.

* Heart Disease, Cancer, and Stroke Amendments of 1965, authorizing funds towards the eventual establishment of regional programs of research, training, and demonstration of patient care in the fields of heart disease, cancer, stroke, and related diseases.

* Health Professions Educational Assistance Act Amendments of 1965, extending the program of matching grants for the construction, replacement, or rehabilitation of teaching facilities for the training of physicians, dentists and health personnel, and extending the program which provides student loan funds to schools of medicine, dentistry and related professions.

* Medical Library Assistance Act of 1965, providing grants to meet the need for adequate medical library services, resources, and facilities. Congress has recently enacted the Second Supplemental Appropriation Act of 1966, which provides the funds necessary to implement this Medical Library Assistance program which was so strongly supported by the medical profession.

* Last, but not least, the Medicare program which, beginning July first, will make available health insurance benefits to more than 19 million older Americans.

The health of the American people is primarily dependent upon the splendid service of the medical profession. I believe you are now giving us the finest medical skills in the world. But the recent acts of Congress can advance your efforts provided these new programs have the benefits of your wisdom and cooperation in their proper administration.

There are indications of a growing cooperation by doctors in our assistance programs. During the Congressional debate on the Medicare bill, I stated on at least two occasions that while

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* Presented at the Annual Convention of the South Dakota State Medical Association, Huron, South Dakota, May 24, 1966.

I favored the legislation, I respected some of the legitimate questions being raised by our doctors. I expressed the hope that the Administration would consult with members of the medical profession in order that this new program could operate effectively. Now that Medicare is law, it is encouraging that the Government is utilizing the expert services and advice which only our physicians can provide. The new men in leadership positions in the Department of Health, Education and Welfare are giving top priority to the development of an effective partnership with professional medicine. Secretary Gardner recently told leading representatives of the American Medical Association that "the government needs your advice and counsel, and you need to have your say in the shaping of this program." As a result of this cooperation, a series of new ideas suggested by the medical profession are being incorporated into the Medicare program.

Since the enactment of the Medicare Law, numerous meetings have been held by technical committees of the Social Security Administration. Serving on the committees relating to the quality of medical care, cost of medical care, role of hospitals, role of insurance companies, and nursing home participation are forty physicians nominated by the American Medical Association. Growing out of these meetings, tentative regulations have been prepared and some have been published in the Federal Register. Two of the regulations — eligibility and the conditions of participation for hospitals — have been firmed up and it is expected that the complete regulations will become effective shortly before the program is scheduled to begin on July first.

Implementation of the Medicare program is only one striking example of cooperation between the medical profession and the Government. For many years, the American Medical Association has prepared an annual report of all Federal medical expenditures during each fiscal year. As a member of the Senate, I can assure you that this report, which describes and analyzes every program pertaining to the health of our nation, is an invaluable service to the Congress. It represents the kind of cooperation needed if we are to meet pressing health needs.

At the White House Conference on Health held in Washington last year, James Appel, president of the American Medical Association, emphasized the Association's vital concern over present inadequacies of medical care. "To state the matter in its boldest terms, our present medical care, fine as it is, is not good enough . . . ," he said. He pledged the support of the AMA in the nation's quest for better health.

This pledge has already been kept as it concerns perhaps the most serious health problem which now confronts us — the mounting shortage of medical manpower and facilities. The real crisis, as the White House Conference made clear, is the shortage of health manpower — not so much in numbers as in quality, efficiency, and training for new types of assignments. In some areas, of course, the shortage is largely numerical. For example, recent surveys indicate that 300,000 additional nurses will be needed in the next five years and that there are currently 100,000 job openings reported in this field.

As many of you know, President Johnson has created a special commission to study such health manpower shortages, to recommend ways to speed the education of doctors and other highly-trained health personnel, and to improve the use of those already available in government and private life. Several of our most eminent physicians have been asked to serve on this commission. It is yet another example of the cooperative effort needed to obtain long-range answers to our serious health problems.

The Department of Health, Education and Welfare has indicated that largely through consultations with physicians, some of its assumptions regarding the health manpower shortage have been revealed as faulty. There is a growing recognition that insofar as physicians are concerned, the problem is not so much one of **numbers** as of **distribution.** The AMA Council on Rural Health works closely with State medical societies to improve the imbalance in the distribution of physicians in rural areas, which characterizes much of our State. It is my earnest hope that we can continue our efforts to improve the physician-patient ratio in South Dakota, which is one of the lowest in the nation.

Working together, there is much we can do to improve health standards in South Dakota and throughout the nation. The Public Health Service budget for 1967 proposes a total of $1.3 million for South Dakota for the construction and modernization of hospitals, long-term care facilities, diagnostic and treatment centers, public health centers, and rehabilitation facilities under the Hill-Burton program.

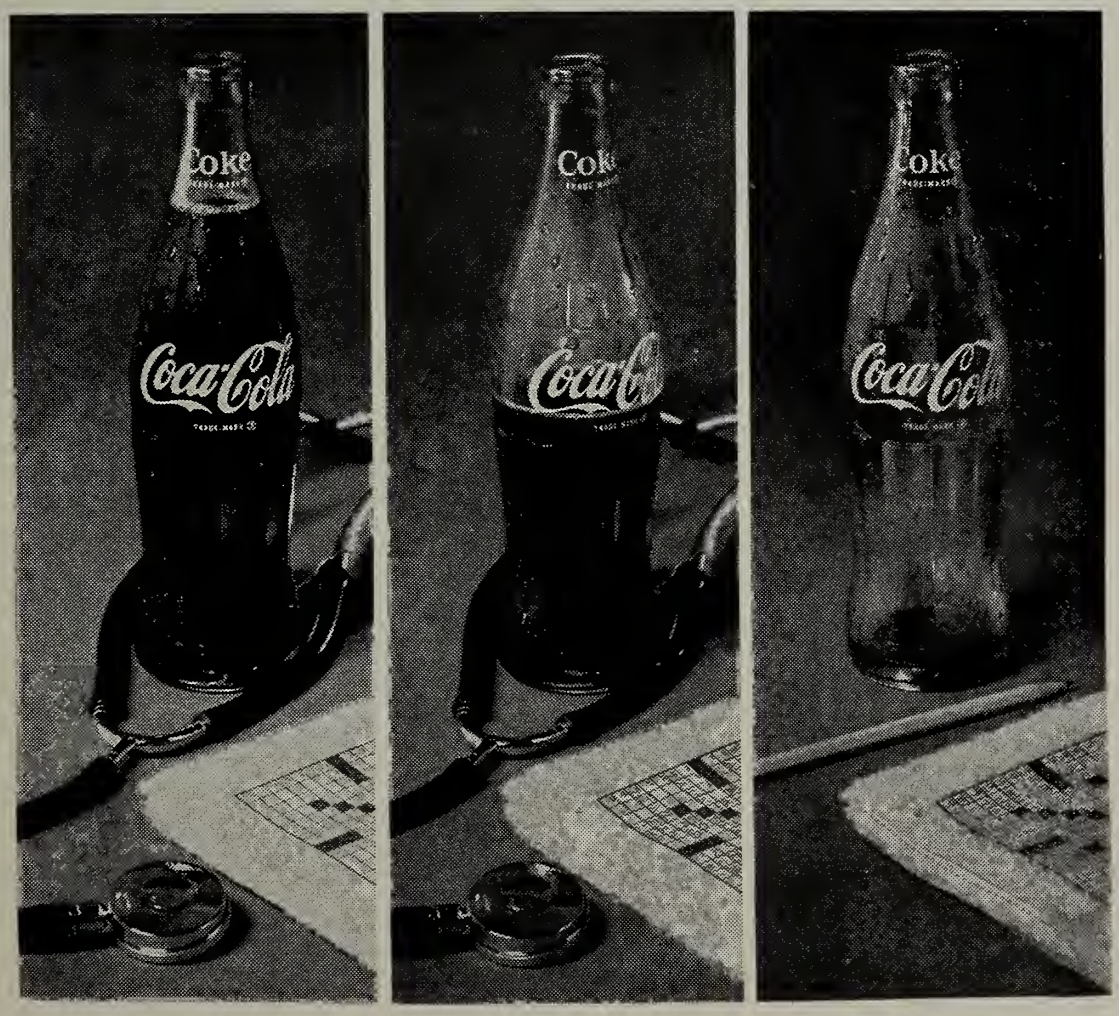
There is now under consideration a project of major proportions which could have a highly beneficial effect upon the practice of medicine in our State. I refer to the proposal sponsored

principally by your Association for Federal assistance in establishing a demonstration project in South Dakota for medical history data processing. This idea, which has the cooperation of the South Dakota Hospital Association, was largely the creation of your distinguished past president, Dr. James P. Steele of Yankton. The proposal has been submitted to the Department of Health, Education and Welfare, and I am working with top officials of the Department toward its approval.

New techniques in data processing could save doctors long hours of time-consuming paperwork in the processing of patient records and billing. The average doctor spends up to 30% of his time on paperwork; automatic data processing could cut this figure in half. By eliminating much of the present paperwork and administrative detail now burdening doctors, the data processing system would give doctors considerably more time for their patients and other activities. If this project wins approval, it will represent one of the most important advances in the field of medical care in many years and would provide a new opportunity for our State to lead the way in advancing medical science.

To attempt to indicate the scope and number of health measures pending in the Congress would probably be an impossible task. Most of the major bills are doubtless well known by the Association. Suffice it to say that they range from hospital modernization to the training of allied health personnel to the creation of a Federal Commission on Alcoholism, and the humane treatment of experimental animals. Because of the major health legislation enacted by Congress last year, it is unlikely that final action will be completed on many additional health measures during the current session.

Permit me, in closing, to express the hope that the members of your Association will continue to keep closely abreast of health developments in the Congress, to analyze each important piece of legislation with objectivity, and to press for the enactment of those which it believes will help to further meet the health needs of our citizens.



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S. D. DOCTOR HEADS VIET NAM SURGICAL TEAM*

By
Ronald Ross
Minneapolis Tribune
Far East Correspondent

NHA TRANG, South Viet Nam — The doctor's wife said she knew her husband would get to Viet Nam, that it was only a matter of time.

"She was right," Dr. Robert H. Hayes, Winner, S. D., said, as he showed me around the Khanh Hoa provincial hospital at Nha Trang.

"I'd had a feeling for some time that I should be in Viet Nam. This is not just a regular army fight, but everybody's."

Hayes, who has a lieutenant colonel's commission in the Army Reserve and is an active South Dakota National Guardsman, heads the 18-member U. S. surgical team at the hospital and has been in Viet Nam since January.

The hospital, like many in Viet Nam is crowded, broken-down and lacking in many essential facilities, not the least of which is steady water and power supplies.

But, just as improvements are beginning to be made in other hospitals, so too in Nha Trang, where the United States is helping both with trained personnel and materials.

"We could get on a lot faster," Hayes said, "if we had the simple things like clean floors and screens on the windows."

American servicemen and the team's nurses are helping with the first problem on a volunteer basis, and the U. S. Air Force with the second.

The Vietnamese are not a dirty people by nature, it's just that in most towns and cities water is in extremely short supply and has to be used sparingly.

Nha Trang is trying to remedy this but the principal water mains can't be found. This has meant extensive digging up of streets in the area around the hospital in order to locate the big pipes laid during the time of French occupation.

Screens are something of a novelty for most Vietnamese who simply can't afford them. Put a Vietnamese peasant family in a room with screened windows and they will punch holes through the wire so that they can throw their cans and garbage outside.

"We're getting extra strong screens," Hayes said.

Some of the conditions in which Hayes and his team are working are primitive at best.

In the medical wing, for example, there are several bare, concrete-floored rooms set aside for cholera patients.

The patients sleep on canvas cots.

From time to time the floor is hosed down and waste and water flushed out a hole knocked in the brick wall and into a gutter that runs alongside the building.

Hayes has words of high praise for the Vietnamese staff of the hospital.

"But," he said, with a resigned shrug, "they are understaffed and underpaid. The administrator here, for example, gets so little he has to work at private practice a great deal of the time in order to make enough to live."

Part of the tour took us around two new wings that are nearing completion. These are clean, well-lighted, functional structures that will greatly improve the hospital's facilities but will still not contain enough room for all the services the hospital performs.

The hospital, currently, has some 230 beds but more than 230 patients, especially during the frequent cholera epidemics.

The area the hospital serves is large and includes several of the central highland provinces.

Unlike the provincial hospital at Da Nang which deals with a high percentage of war casualties, Hayes said Nha Trang hospital usually will have about 10 per cent of patients suffering from war wounds.

But the hospital and the American and Vietnamese staff have to be prepared at all hours of the day for just the sort of emergency that occurred recently.

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* Reprinted from the **Minneapolis Tribune.**



Photo Courtesy Minneapolis Tribune

Two small villages had been hit by Viet Cong mortars and several villagers killed and wounded.

According to one of the wounded, the Viet Cong had warned the villagers that if they sought medical treatment the villages would be wiped out.

Nevertheless, they had called for assistance and the wounded had been brought into Nha Trang.

There were nine of them, some in critical condition with head and stomach wounds.

When I saw them with Hayes, they were all patched up and well on the way to recovery.

Hayes said the team of doctors was involved in such a wide range of activities that the concept under which it began operating — as a purely surgical team — was being broadened to include all phases of medical care.

The doctor himself is a general practitioner.

He began his medical career after serving with the U. S. Navy during World War II.

With a good practice, a wife, and six children (three sons and three daughters, ranging in ages from 8 to 22), I was curious about his decision to come to Viet Nam.

"I knew you would ask that," he said, "and I often ask myself.

"I'm a staunch believer in the National Guard. I've been recalled twice to an active unit. I know a lot of guys here in Viet Nam.

"I've got a 16-year-old son who will be here soon and I wanted to look at it myself.

"I have firm convictions about what our country is doing and what we should all be doing to help."

He paused, his eyes thoughtful.

"Sounds corny, when you say it, doesn't it? But my wife knew. She said she knew I would and that it was only a matter of time."

DEADWOOD DOCTOR

F. S. Howe, M.D.

CHAPTER IV

A DEADWOOD PRACTICE

In that day, no woman was ever seen in a saloon except the inmates of the houses. The inmates smoked cigarettes, wore short skirts and drank whiskey. In case any lady wished to see just what went on, she made arrangements with the proprietor and was escorted by some gentleman known to the proprietor. They went up the back stairs and occupied a box with heavy curtains where they could look down on the stage, see the dancers and what have you. Any lady seen going in the front door was marked. Nobody would have anything to do with her. It was whispered around that one respectable married woman went into the "Green Front" in the evenings. Her husband, who worked nights, did not know about his wife's unfortunate curiosity. As word filtered around town, the couple and their two children were ostracized. Eventually they all left Deadwood.

I had been practicing only a few months when I had what to me later was a very amusing experience. At that time, however, it was extremely serious. I was taking care of an old colored lady who had a leakage of the heart and what we now know as high blood pressure (we had no way of taking blood pressures then) and kidney disease. It was very apparent that she had only a short time to live. Her husband, rather a fine old colored man, caught me right in front of the hospital and said he wanted to know the exact truth about his wife. Under no circumstances would he tell his wife but he wanted to know.

Remembering the Hippocratic Oath and believing that you had to tell the truth, and all the truth, I told him that his wife had no chance and would not live. The same day I lost the case to another doctor who had had more experience in handling people than I did at that time. I felt terribly hurt and asked him why he had changed doctors. His answer was, "Well, why shouldn't I change? You gave her up." She died within a few days. I learned not to be too frank in prognosis.

Among some of the very interesting cases which I have treated in Deadwood was one which always amused me very much, although it was quite serious. During the bootleg days, a certain colored gentleman was doing very well and seemed to have numerous customers. He decided to expand his business somewhat and imported a couple of very pretty mulatto girls.

One of the first visitors was a colored boy who was known as a pugilist. He had been in the ring quite a good many times and was locally known as a pretty tough boy. He was quite taken with the looks of one of the two girls and decided that he would be her guest. She objected strenuously and told him to get out. It seems that according to his usual custom he was about to beat her into submission.

She slipped a razor into her hand and started to work. He was attempting to run away as rapidly as possible, and she chose the right leg as being the best place to work, starting high up on the thigh. Each time that leg would come up as he was running, she would make a new incision. She did the most scientific job I have ever seen, not a tendon cut. His clothing, (I well remember his long underwear) was cut into ribbons. It seemed that each gash was neatly done at regular intervals clear from the thigh to just above the ankle. I was called to the hospital and heard the story. I turned him over and started in, as usual without any anesthetic. It took some 40 sutures to patch up the boy. No arrests were made but the next day the two colored ladies left for Alliance, Nebraska, from whence they came. The colored boy was strangely silent and wasn't doing any boasting about his prowess.

Two boys who had been regularly smashing up some of the restaurants apparently got enough fire water to be very brave and proceeded into the kitchen of one of the local restaurants. The cook who was a small boy and in very poor health at the time grabbed his carving knife to defend himself. When he got through, he had stabbed one of the boys through

the liver and the other one through the lung. When I was called down to see them, I called the ambulance and told the ambulance driver that if they were breathing when he got to the hospital to take them to the hospital and if they weren't to take them to the funeral parlor. I proceeded to the hospital and in spite of the fact that we had no plasma or transfusions or even glucose at that time, both boys lived. They are still alive. So far as I know they were permanently cured of wrecking the local eating establishments.

When I first came to Deadwood, there was a section of town known as China Town located on lower Main Street. There were some 400 Chinese living there at the time. We had two tongs, one headed by Dr. Wing Tsue, the other one by Hi Kee.

I became very well acquainted with practically all of the Chinamen of Deadwood, in fact, usually took care of them. Dr. Wing Tsue was one of the finest men I have ever known. He had a fine family all but one of whom graduated from Oberlin College. I took care of his wife in a number of confinements. He ran a combination drug store and general store. He presented me with a very beautiful silk scarf as a Christmas present one year. The Chinese were inveterate gamblers. They had their own game of fantan. I was taken as a guest to watch the game on one occasion but it made very little sense to me.

I saw a number of Chinese funerals while they were here. They beat pans and made a lot of noise to scare away the devils. They also put various articles of food on the graves. They had a Joss House and a Masonic Temple at one time in Deadwood. Most of the restaurants in town were Chinese and they also had a number of laundries. There was one Chinaman named Sam Wong who had a hand laundry on Main Street. Being out all hours of the night, I always, regardless of the hour, could see him ironing away in his laundry. As I knew him very well, I asked him at one time when he slept, if ever. He said, "Me get on table and sleep when I get tired."

The Chinese women had to occupy a house off the street. They never could be on the street. There were two Chinese women who occupied a little house right on Main Street. I was called to see one of them who was ill. Our Chinese janitor shook his head and made the statement, "Them China women no good — bad women." In other words, a China woman who lived on the street was not considered respectable.

There were some very interesting names of special characters in Deadwood. A few of them were Bed Rock Tom, Jew Jake, Long Bill, Swill Barrel Jimmy, Cocaine Annie and China Mary. There was one section of Deadwood known as Cocaine Hill. At that time any person could go to a drug store and get any narcotic or any other drug they cared to buy. Dope fiends were very common, of course, because there was no limitation of the drugs. Many of the Chinese smoked opium.

Some of the names of the saloons were quite interesting. The Last Chance, the Family Liquor Store, and Five Miles to the Next Saloon were familiar names. The so-called variety theatres were three in number when I came to Deadwood — the Green Front, the Combination Theatre and the Mansion. The Green Front and Combination were on a vaudeville circuit. I remember very well going to the Green Front to see John L. Sullivan. Apparently they could find no one to box him so his exhibition was with a punching bag. Occasionally there were some very excellent road shows in these so-called theatres.

Gambling was largely roulette wheel, poker and faro bank. These games usually lasted for several days and when it became whispered about that there was a big game on at some of the gambling halls, all the men had to go down to see just what the stakes were. I remember going down to one of these gambling halls and seeing what I was told was a $10,000 game. That was quite a sight for me.

(To be Continued)

ADDITIONS TO MEMBERSHIP ROSTERS

Membership dues have been received from the following physicians and their names should be added to the Membership Rosters as published in the August issue:

E. J. D'Arata, M.D. — New Underwood

Noe Authier, M.D. — Sioux Falls

John Hoskins, M.D. — Sioux Falls

Paul H. Koren, M.D. — Rapid City

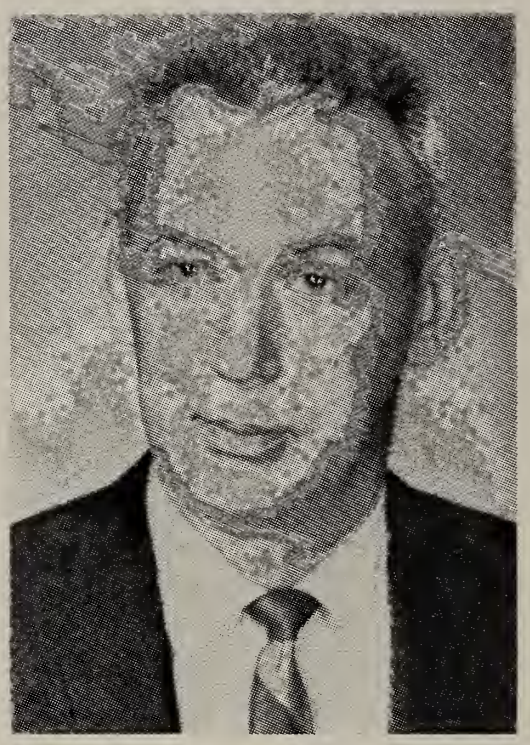
W. L. Meyer, M.D. — Hot Springs

J. C. Murphy, M.D. — Hot Springs

Loyd R. Wagner M.D. — Sioux Falls

B. J. Williams, M.D. — Sioux Falls

PRESIDENT'S PAGE



Frustration over the inconsistencies, malfunctions, and idiosyncracies of MEDICARE is a common denominator in our professional lives today. It is an emotion, strong, and dominant, and often consuming. One way of ridding curselves of this "plague" is to pick the nearest "whipping boy" and lay on the lashes until our frustration is spent.

Our staff at the State Office has been finding itself all too frequently playing the role of "whipping boy" to some of us who are being consumed by the passion of righteous indignation.

In the administration of MEDICARE our people in Sioux Falls can only follow the regulations set down by HEW. We are not too sure, at this point whether we will be able to live with these rules and regulations as the "Honeymoon" is becoming shorter by the moment as far as our Blue Shield is concerned.

Please, before you "blow your stack" at someone in the Sioux Falls office, consider that they are probably as frustrated as you are, then, if you must still "vent your spleen," call Dick Erickson as he has informed me his epidermis has become hypertrophied to Elephantine proportions.

Preston Brogdon, M.D.
President of the South Dakota State
Medical Association

Letter to the Editor

Dear Sir:

Membership of the South Dakota State Medical Association has expressed a very active interest in medical education in the state. One expression of this support, namely contributions to the Medical School Endowment Fund and AMA-ERF, has previously been acknowledged.[1] The very high percentage of South Dakota physicians who contribute of their time, efforts, and money in support of our preceptorship program throughout the state and clerkship training program in Sioux Falls, represents a voluntary contribution essential to the development of our student-physicians.

It is then with a sense of responsibility to the interested physician population that I report on a problem which, unless counteracted, foreshadows a continual decline in medical education in the state.

Printed on page 49 is a table which identifies the support South Dakota affords its medical faculty in relation to other schools with which it is competing for teaching faculty. One may reason that if faculty salaries are adequate the individual can provide for his own "fringe benefits." Indeed, I personally would much prefer that this situation prevail, for then the responsibility is placed where perhaps it belongs, namely with the individual to provide for his own. However, the facts are that our faculty salaries in the professorial ranks are in the lowest ten percentile of all medical schools, our associate professors in the lowest 20%, and even assistant professors do not equal the median salary range for basic science faculty in medical schools.

The medical faculty at the University of South Dakota is, on the whole, a dedicated, sincere, and accomplished staff. This can be measured by the success of our students in transfer to other schools, by the faculty's research accomplishments, and their support of graduate and postgraduate training activities. This is no good reason why advantage should be taken of them. Equally serious is the loss to the school of faculty with some years of tenure whose position must necessarily be replaced, because of inadequate funding, with less experienced staff.

The competition for staff is particularly keen among the schools since more than 5% of budgeted staff positions are unfilled. One must add to this the demand for faculty from the newly organized and expanding schools.[2] The attractions of living in Vermillion, South Dakota are hardly sufficient to offset a loss of several hundreds, or thousands, of dollars in income.

The medical school has become closely involved with the interests of many public agencies in the state for planning and development of expanded educational programs in medicine and health related fields. Many academic consultants have been involved and generally have expressed grave doubts that any new or expanded program could be successfully staffed in the face of what, on a competitive basis, is a completely inadequate schedule for salaries and fringe benefits.

---

[1]Hard, W. L.; "Physician 'giving' to medical education in South Dakota." **S.D.J. Med. Pharm.,** 17:23-26; 1964.

[2]Association American Medical Colleges, Datagrams, Vol. 7 (9), 1966.

Respectfully yours,

W. L. Hard, Dean

School of Medicine

University of South Dakota

(See Page 49 for Table)

EDITOR'S NOTE: The loans and scholarships available to medical students will permit them to finance their medical education with a minimal investment of their own. South Dakota is going to be in the position of not having a faculty to teach these students unless our standards are raised to those of other medical schools. Each doctor in the state should contact his legislators regarding this problem, which is becoming increasingly acute.

R. E. Van Demark, M.D., Editor

This is your
MEDICAL ASSOCIATION

News Notes • Changes • Births • News

Pop's Proverb

The cake I eat does not taste as good as the one in the bakery window looks.

AAGP OFFICER NAMED TO FEDERAL MEDICAL POST

Francis L. Land, M.D., an Indiana family doctor who is vice-president of the American Academy of General Practice, has been appointed to a new federal medical post concerned with expediting Medicare's Title 19.

Dr. Land, of Fort Wayne, will assume the duties of Medical Consultant to the Commissioner of Welfare. His assignment will encompass the medical aspects of Title 19, which provides medical and dental assistance for indigent persons under 65 and children.

* * *

James C. Larson, M.D., has joined the staff of the Brown Clinic in Watertown, South Dakota.

Dr. Larson is a graduate of Northwestern University School of Medicine. He began his medical education at the University of South Dakota, graduating there in 1956. He spent a month immediately afterward with the Brown Clinic under a preceptorship, then entered Northwestern to complete his medical schooling.

Dr. Larson is married, and has two daughters.

Richard D. Schultz, M.D., Diplomate, American Board of Pathology, is now associated with Drs. Karl H. Wegner, Richard J. Weaver, and John F. Barlow in the private practice of pathology at the Laboratory of Clinical Medicine in Sioux Falls and at the Sioux Valley Hospital.

* * *

The National Conference on Air Pollution will be held December 12-14, 1966, at the Sheraton-Park Hotel in Washington, D. C.

* * *

M. R. Cosand, M.D., Winner, South Dakota, is to be initiated into the American College of Surgeons at their October meeting.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

The Whetstone District Medical Society met on September 14th in Milbank with twenty-four physicians and wives attending. **Preston Brogdon, M.D.,** President of the State Association, made his official visitation to the district and discussed current topics of interest to the medical profession. **Fred Stahmann, M.D.,** Sioux Falls, presented an interesting paper on intra-uterine devices, contraception and chemotherapy in the practice of obstetrics and gynecology.

* * *

Charles Loos, M.D., has recently begun his medical practice in Chamberlain, South Dakota.

Dr. Loos is a native of Delmont, South Dakota. He earned both his bachelor of science and M.D. degrees at Creighton University in Omaha. For the past two years he served on the surgical staff of the Indian Hospital at Phoenix, Arizona.

Dr. and Mrs. Loos are the parents of two boys.

* * *

The Third District Medical Society (Brookings-Madison) met on August 11th at the Brookings Country Club. Thirty physicians and their wives were present for a dinner and business meeting. Dr. Magni Davidson presented slides of his trip to Iceland and Norway.

The Aberdeen District Medical Society met on September 7th with twenty-five doctors and their wives attending. A short business meeting was held with Richard Erickson, Executive Secretary of the State Medical Association addressing the group on aspects of Medicare, Blue Shield, and State Medical Association affairs.

* * *

Announcement is made of the Nebraska Mid-State Medical Conference to be held at The Holiday Inn, Kearney, Nebraska, November 16, 1966. The subject of the Conference is "Female Hormone Therapy — Recent Advances."

William H. Hoewing, M.D., has joined Drs. C. E. Roper and T. R. Jacobson at the Butler Clinic in Hot Springs, South Dakota.

Dr. Hoewing is a graduate of the University of Nebraska College of Medicine, and has practiced for the past year at Sutherland, Nebraska. He is married and has one daughter.

* * *

The fall organizational meeting of the Central Area Mental Health Association was held recently in Pierre. **B. O. Lindbloom, M.D.** and **Barbara K. Spears, M.D.,** were elected to 3-year terms on the Board of Directors.

The 1967 Scientific Session of the American Cancer Society will be held at the Sheraton-Dallas Hotel in Dallas, Texas, on May 3, 1967.

This symposium on "Current Concepts in Etiology and Diagnosis of Cancer" is open to all members of the medical profession and students. There is no registration fee.

* * *

M. I. Sabbagh, M.D., has notified the State Medical Association Office that he has terminated his practice in McLaughlin, South Dakota. Dr. Sabbagh plans to join the St. Clair Clinic in St. Clair, Michigan.

(Continued from Page 47)

A COMPARISON OF FRINGE BENEFITS CONTRIBUTED TO MEDICAL FACULTY IN 74 U. S. MEDICAL SCHOOLS FOR 1965-1966 YEAR

(Source: Association American Medical Colleges; Datagrams, Vol. 7(11), 1966.)

	Number of Schools Which Pay All or A Part of the Following	Number of Schools Which Pay No Part of the Following	SOUTH DAKOTA
SOCIAL SECURITY	71	3	Does
OTHER RETIREMENT PLANS**	74		Does**
TUITION FOR CHILDREN	33	41	Does NOT
GROUP HEALTH INSURANCE	50	24	Does NOT
GROUP LIFE INSURANCE	54	20	Does NOT
MALPRACTICE INSURANCE	37	37	Does NOT
PROFESSIONAL SOCIETY DUES	20	54	Does NOT

**Other Retirement Plans—

56 Schools Contribute $1,000.00 or More.
70 Schools Contribute $500.00 or More.
73 Schools Contribute $300.00 or More.
1 School Contributes Less Than $300.00 — South Dakota, With a Contribution of $144.00
Average Contribution For All 74 Schools Is $1,445.00 or $1,301.00 More Than South Dakota.

All but 6 of the 74 schools allow a maximum of $5,000.00 or more of Group Life Insurance. South Dakota has a $2,000.00 limit.

The 74 school average of the cash values of fringe benefits is $2,187.00. South Dakota "gives" $424.00 or $1,763 below the average.

Only six (6) schools have fringe benefits amounting to less than $1,000.00. South Dakota is the lowest of these 6.

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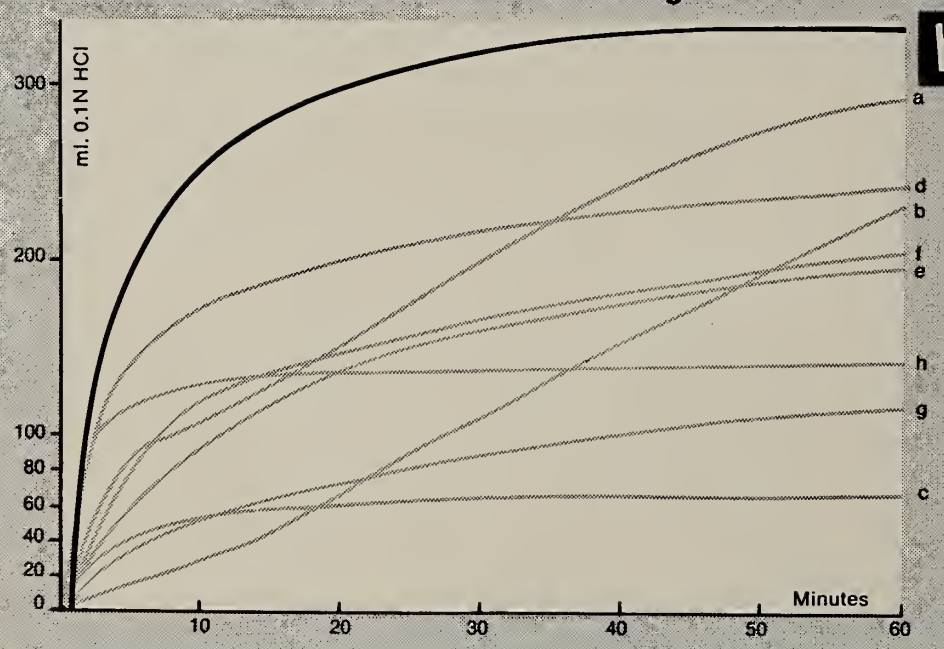
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*Hinkel, E. T., Jr. (New York): Data in the files of the Department of Medical Research, Winthrop Laboratories.

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JOURNAL OF MEDICINE

NOVEMBER • 1966



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THE SOUTH DAKOTA

JOURNAL OF MEDICINE

**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **November, 1966** **Number 11**

CONTENTS

The South Dakota Poison Information Center 31
R. P. Spoor, Ph.D.; J. N. Spencer, Ph.D.

Muscular Dystrophy: Man and Mouse 35
W. O. Read, Ph.D.; W. L. Jones, M.D.

Congenital Defects 51
H. Phil Gross, M.D.

Clinicopathological Conference — Sioux Valley Hospital 53
John F. Barlow, M.D.; Wallace A. Arneson, M.D., F.A.C.S.

Deadwood Doctor 57
F. S. Howe, M.D.

Letter to the Editor 58

PathCAPsule . . . . . : 59

Minutes of Council Meeting 61

President's Page 63

This Is Your Medical Association 64

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pyelitis?
urethritis?
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References: (1) Based on 23 clinical papers, 1512 cases. Bibliography on request. (2) Bush, I. M., Orkin, L. A., and Winter, J. W., in Sylvester, J. C.: Antimicrobial Agents and Chemotherapy—1964, Ann Arbor, American Society for Microbiology, 1965, p. 722.

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*As many as 9 out of 10 urinary tract infections are now caused by gram-negative organisms: E. coli, Klebsiella, Aerobacter, Proteus, Paracolon or Pseudomonas[2]... However, infections of the urethra and prostate caused by non-gonococcal gram-negative organisms are believed to be less prevalent.

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JOURNAL OF MEDICINE

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The South Dakota Poison Information Center

By
R. P. Spoor, Ph.D.
J. N. Spencer, Ph.D.
University of South Dakota
School of Medicine
Vermillion, South Dakota

Approximately 1,000,000 poisonings occur in the United States each year. Estimates of fatal poisonings vary somewhat, but range from approximately 2,000 to 3,000 cases each year.[1, 2] Included in these figures are accidental, suicidal, and homicidal poisoning. In view of the relatively large numbers of persons involved, poisons play a major role in medicine. A poison can be defined as any substance which, when absorbed in small amounts, will cause harm to or the death of an organism. Such a definition includes most of the chemical products in the home, farm, and in industry. It also includes, and rightly so, all therapeutic agents, since in general, therapy consists of a carefully controlled poisoning of some system. Toxicity is manifest if control is not carefully maintained. Of the poisonings in the U. S. which are fatal, one-third to one-half occur in children under the age of 5, and virtually all of these are accidental and occur in the home. The AMA estimates that approximately 250,000 hazardous trade products are available to the public. Since it is virtually impossible for a physician to be familiar with the contents of and therapeutic regimen for such a vast number of products, poison control centers were established throughout the United States. The first of these was established in Chicago in 1953. Presently there are in excess of 500 such centers which receive more than half a million calls each year. Most of the centers operate on a 24 hour basis. Some are information centers only, others provide both information and treatment, and in some cases chemical analysis as well. The poison information center at Vermillion provides only an information service. Although we do not have facilities for treatment or chemical analysis, we are able to provide information on almost any product available to the public. We maintain a card file on many products, and have access to a number of books and pamphlets as well as the Medical Library. Thus we are able to consolidate a rather extensive collection of information in a place where it is accessible by telephone to all South Dakota physicians and residents as well. (A number of calls come from residents in outlying areas where to reach a doctor is a problem. We are usually asked whether a doctor should be consulted, and if so, what to do until he can be reached.)

Since March, 1961, the earliest records available, the Poison Information Center at Vermillion has received 224 calls involving approximately 140 toxic agents. The list is extensive, and for this reason is not included in this article. It includes many agricultural products, drugs, household items, cosmetics, paints and others. The wide variety of agents serves to emphasize the fact that almost anything is a potential poison, especially if there are children involved. Table one shows a breakdown of cases according to age and sex. Note that more than half (62%) of the cases are children aged 5 and

TABLE I
Distribution of Patients by Age and Sex

Sex	Age 0-5 yr.	Age 6-14 yr.	Age over 14 yr.	Age Total
Male	75	11	36	122
Female	56	6	29	91
Unreported	8	2	1	11
	139	19	66	224

Some cases involved more than one toxic agent, or whole family of unreported distribution.

A portion of this material was presented by R. P. Spoor to the Black Hills Medical Society Seminar, August 7, 1965, at Rapid City, South Dakota.

A copy of the list containing all of the agents for which information has been requested can be obtained by writing to the center at Vermillion.

under and that the majority of these are male children. Children appear to be more of a problem in the state than in the nation. It should be noted, however, that the per capita poisoning rate in South Dakota is about one twentieth that of the nation, based on calls to the center. Although the number of calls to the center may not accurately reflect the total number of poison cases, it is probably safe to say that the poisoning rate in the state is considerably lower than the national average. Males are more frequently poisoned than females. Agricultural accidents in adults, and ingestion of agricultural products by children account for most of the male poisonings. Females adults are poisoned more often by drugs.

TABLE 2

Comparison of Some State and National Figures

	Percent of Total Poisonings	
Type of Agent	S. Dak.	National
Agricultural	24	11
Household	20	21
Drugs	28	55
Others	28	13

Table two compares some of the figures for several agents on a state and a national basis. The two most significant differences are the low number of drug poisonings, and the higher incidence of agricultural products as toxic agents. Since this is an agricultural state, one might expect a higher incidence of agricultural accidents, and this is shown to be the case. The difference is not great enough to account for the lower drug incidence however. The latter figure may reflect several things, among which is a lower suicide rate in the state, and a greater awareness on the part of physicians of the state of the hazards of drug intoxication. It should be emphasized, however, that drugs still account for more than a fourth of the incidents in the state, and that they are a significant hazard in South Dakota homes. To further break down the categories shown in the table, insecticides account for more than half of the agricultural poisoning calls, laundry preparations for about one fifth of the household items, and tranquilizers and sedatives for more than a third of the drug induced poisonings in the state.

An over-all summary of the activity of the center is presented in table three. In all, 224 calls have come in to the center in the past

TABLE 3

SUMMARY OF POISON INFORMATION CENTER CALLS

Type of Poison	Number of Cases	Number of Agents	Deaths
AGRICULTURAL (Weed killer, animal medicine, insecticide, rodenticide, seed, etc.)	53	31	2
GASSES & VAPORS (all types)	16	6	1
HOUSEHOLD PRODUCTS (cosmetics, paints, paint thinners, polishes, laundry products, etc.)	74	43	0
MEDICINES	63	32	2
PLANTS	9	6	0
OTHER	9	20	0

Some calls involve the poisoning of a single individual with more than one agent, or a whole family with several agents.

five years, the number per year rising each year. Five deaths have been reported, but only three of these are definitely attributable to toxic agents, the other two being complicated by disease. The busiest months seem to be May, June and September, which probably results from the confusion of children starting or ending the school year. The least calls come in the months of February, March, and December. Of the 139 poisonings that occurred in children in the 5 or younger group, only four can be considered nonpreventable accidents. In other words, if a few simple precautions had been taken by their parents, only four of these incidents could have occurred. One child died as a result of drinking a moth killing preparation which had been placed in a pop bottle. Another poisoning occurred in an adult male who cleaned the nozzles of a sprayer by blowing them out with his mouth. In another case, a man was poisoned by an antiesterase insecticide while spraying upwind. In a similar incident in another state, the man was treated in the hospital and sent home in the same clothes he came in. He succumbed some time later of esterase poisoning from the residual on his clothing. These cases are meant to serve as examples of disregard on the part of both physicians and laymen for the potential danger from poisoning.

Poisons can be broken into two rather broad categories:

1. Those agents which cause physical damage to tissues — acids, bases corrosives; certain metals are examples of this type.
2. Those agents which generally do little physical damage, but rather exert pharmacologic actions when absorbed into the body; drugs, pesticides, plant materials are examples.

Treatment of the first group consists of removing the material, either by washing or chemical neutralization, and then repairing the damage. These are primarily medical problems which are familiar to most.

TABLE 4

Types of Poisonous Agents

DRUGS	AGRICULTURAL	HOUSEHOLD
Aspirin	Antiesterases	Cleaners
Antidepressants	Halogenated organic	Paints
Depressants	Heavy metals	Solvents
Narcotics	Anticoagulants	Cosmetics
Others		Plants

The second group can be further broken down as shown in table four. The grouping shown is arranged for convenience in discussion rather than on a strict pharmacologic basis. There are remarkably few specific antidotes to toxic agents. For the narcotics, nalorphine or levallorphan will specifically reverse the depression seen in narcotic overdose, and they are the treatment of choice. The heavy metals can be antidoted with BAL (dimercaperol) in the case of Hg and As, and by EDTA in the case of lead. BAL may also be used for Sb, but is not as effective as for the others. The anticoagulants of the coumarin type can be antidoted with Vitamin K if no bleeding is apparent at the time, but will not act quickly enough in an acute situation. In the emergency situation, fresh plasma, with the clotting mechanism intact is the required treatment. Vitamin K should also be given. The antiesterases, since they inhibit acetylcholinesterase at all sites cannot be totally antidoted by any one drug. Atropine, in large doses (2 mg or more) will combat the parasympathetic symptoms and appears to diminish the CNS effects of the poison as well. Protopam, or one of its equivalents, is also effective in some cases in bringing about a more rapid recovery from the effects of the antiesterase.* The patient then should avoid contact with antiesterases for several weeks.

The treatment of poisoning by other agents consists of removing as much of the material from the gut as is possible before it is absorbed, and then providing supportive therapy. Aspirin, since it is a frequently encountered poison in children, deserves special mention. Early in intoxication, there is a respiratory alkalosis induced by the drug stimulating respiration. If a sufficient quantity has been ingested, metabolic derangements will produce an acidosis, ketosis, dehydration, hypokalemia and hyperthermia. It is these latter symptoms which must be treated. This is done with electrolyte therapy. This is extremely important in small children, who often die if they have taken large amounts of drug, even in the face of a maximum therapeutic effort. In adults, it is unusual to see enough of the material ingested to produce death, but it can occur. CNS depressants, if taken in sufficient amounts to produce either long standing coma (several days) or respiratory arrest, can be treated with supportive measures and by dialysis if the amount is large. Due to protein binding, dialysis is slow, but probably of benefit. The use of the so-called analeptic drugs is not recommended, since they may produce convulsions, and frequently do not show any real benefit in patients unless they are breathing spontaneously, in which case the analeptic is not necessary. An exception might be in a situation where there are no facilities for proper maintenance of respiration for the required time. In this case, analeptic agents may be of some value, but extreme caution is necessary to avoid the possibility of post-convulsive depression which can occur. In all cases, the most important single problem is the maintenance of an airway and adequate ventilation. In coma of long standing, hypostatic pneumonia, renal failure, and shock may be added complications.

The antidepressant agents can usually be managed with sedatives. Barbiturates are most commonly used, and are probably the best choice. If the patient is not conscious when first seen, care should be taken not to confuse the convulsion-like activity sometimes seen on awakening from a long, barbiturate induced sleep with true convulsions associated with

* A supply of BAL, EDTA, levallorphan, and protopam is maintained at the Poison Control Center for emergency use. They may be obtained in an emergency by calling the center.

CNS stimulants. Fatalities have resulted from this error in judgment. A blood sample should be taken from any patient who is unconscious, **before** any chemical therapy is given.

Other drugs may require more or less specific treatment. The more common ones have been mentioned above.

Halogenated organic compounds, such as lindane, carbon tetrachloride, DDT, and ethylbromide will invariably affect the liver, and usually the kidney as well. Some also produce CNS depression and/or stimulation. It is the CNS effects which produce death in the early phases in those drugs which possess such action. Later, derangement of liver and renal function are the major cause of death and treatment can only be directed at support of the patient until he recovers. These compounds are frequently inhaled in chronic situations and frequently cause chronic poisoning of the individuals who use them. It behooves the physician to be suspicious of any sort of hepatic or blood disorder for which there is no known etiology. Poisoning probably occurs more often than is commonly known, and is thought to be the cause of many undiagnosed illnesses, particularly with these agents.

Many weed killers contain arsenic. Lead is found in gasoline and some paints; mercury in a number of ointments and in gun blueing. Acute poisoning can be treated with BAL or EDTA, depending on the ion involved. Chronic lead poisoning, which is more common than acute, is much more difficult to treat, for that which is deposited in bone and in brain tissue is extremely difficult to remove. Calcium disodium EDTA will lower the levels, particularly in brain, with an extended series of treatments. It should be noted that the so called lead line is no longer considered a good indicator of poisoning, since good oral hygiene will prevent its formation.

Hydrocarbons, such as paint thinners, can, when ingested or inhaled, cause CNS depression much like alcohol. They may also cause blood disorders and hepatic and renal disease in chronic situations. Petroleum products, if ingested, require careful removal. If vomiting and aspiration occur, pneumonitis is virtually inevitable, and almost always fatal.

Most of the general household products belong to the tissue damaging group of poisons. Exceptions to this rule include perfume (alcohol), silver polish (cyanide), insecticides (usually halogenated hydrocarbons, although malathion is available for home use), and after shave lotions (alcohol and menthol). Household agents are the most frequent poisoners of children, and serve to demonstrate that a child will eat or drink anything, however noxious it may seem to an adult.

The best "treatment" of poisoning is prevention. It should be the responsibility of physicians to caution mothers, particularly new mothers of the inherent dangers of materials usually found around the home. The rules for prevention appear frequently in popular magazines, so that they are all aware of them, but it is felt that the same information imparted to a patient by a doctor will carry considerably more weight. The rules, which are very simple, are given below:*

1. Move all medicines, cleaners, paint thinners, polishes, insecticides, etc. out of reach and out of sight of children, and preferably into locked cabinets.
2. Never tell children that medicine is candy or good to eat.
3. Always read labels before giving or taking medicine — never use them in the dark.
4. Never store dangerous materials in food or beverage containers (milk or pop bottles) or in any unlabeled or improperly labeled containers.
5. Supervise children playing with hazardous substances such as airplane cement, paint, soap, etc.
6. Have some idea of the amounts of various substances which are around the house so that should some be ingested, the amount may be estimated, and the severity of the toxicity can be anticipated.

As previously mentioned, of the 139 cases of poisoning in children, we have in our records, only four could have happened if the above rules had been followed. This figure should give adequate reason for communicating this information to the patient.

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2. **Poison Information Activities - Whither Now?** Poison Information Center, Children's Hospital of Los Angeles, Los Angeles, California, 1964.

* The information following can be obtained in card form by request to the South Dakota State Medical Association office, 711 North Lake Avenue, Sioux Falls, S. D. 57104.

MUSCULAR DYSTROPHY
Man and Mouse
A review of current trends*

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During the past five years research in progressive muscular dystrophy has greatly increased our knowledge and understanding of this disease. Genetic research has solved some perplexing problems of classification. Serum enzyme levels of creatinephosphokinase now afford a means of uncovering the preclinical stage of the Duchenne variety of muscular dystrophy. Early histology of the disease can now be studied. Histochemical examination of skeletal muscle has yielded exciting information which appears to be fundamentally related to the dystrophic process. From 80 to 90 percent of female carriers of the Duchenne type of muscular dystrophy can be identified. Tissue culture techniques have answered some problems and electronmicroscopy is yielding its fruits. Cytogenetics and linkage studies of gene position so far have been disappointing but biochemical studies continue to yield valuable information.

A recent survey by the authors revealed 21 cases of muscular dystrophy in the state of South Dakota; 20 cases of "pure" muscular dystrophy and one case of dystrophia myotonica.

EARLY CLASSIFICATION

Muscular dystrophy is a term used to describe a group of genetically determined primary myopathies in which a degenerative process develops in the muscle fibers.[1] Meryon,[2] in 1952, was the first to call attention to this group of diseases. He demonstrated that the affected muscles were the seat of a granular degenera-

* For a number of years the Department of Physiology and Pharmacology at the Medical School, University of South Dakota, has been interested in the problem of muscular dystrophy. Working with Bar Harbor strain 129 dystrophic mice, a number of studies have been completed in an attempt to define a specific biochemical lesion in this primary myopathy. The work has been generously supported by the Muscular Dystrophy Association of America.

TABLE 1
Progressive Muscular Dystrophy in South Dakota*

Type of Muscular Dystrophy	No. of Patients	Age at Onset	Present Age
Duchenne type of Muscular Dystrophy	4	1 to 4.5 years	8 to 16 years
	3	11 to 14 years	14 to 40 years
	1	30 years	33 years
	1	No report	No report
Limb-girdle form of Muscular Dystrophy	1	4 years	12 years
	5	18 to 35 years	35 to 57 years
Facioscapulohumeral	2	a. 7 to 10 years b. No report	32 years No report
Congenital Muscular Dystrophy	1	2 years	15 years
	2	10 years	15 & 18 years
Dystrophia Myotonica	1	18 years	22 years

* Classification as reported.

tion while the spinal cord and nerves were intact.

From the earliest descriptions given of the disease, it was apparent that progressive muscular dystrophy revealed itself in a number of variations. Differences in the muscles initially involved, the age of onset of weakness, rapid or slow progress of the disease, presence or absence of pseudohypertrophy, were the most obvious. Thus Duchenne,[3] in 1861, described a paralysis in children beginning in the pelvic muscles. He described[4] the muscle degeneration and the pseudohypertrophy. Leyden,[5] in 1876, and Moebius,[6] in 1879, called attention to a muscular atrophy beginning in the pelvic girdle which did not exhibit pseudohypertrophy. Erb,[7] in 1884, described a muscular weakness and atrophy beginning in the shoulder girdle. In the same year Landouzy and Dejerine[8] noted involvement of the facial muscles in some of their cases but which were otherwise similar to the scapulohumeral type described by Erb. Hutchinson,[9] in 1879, reported several cases of bilateral ptosis with weakness of the external ocular muscle which Fuchs[10] showed to be a type of muscular dystrophy. Later, Gowers[11] commented on a form of weakness and atrophy which began in the distal musculature (extensors and flexors of hands and feet.) Spiller[12] and Batten[13] recognized this as a form of muscular dystrophy. Oppenheim,[14] in 1900, described a condition of extreme muscular hypotonia at birth (or shortly thereafter) and Batten[15] suggested that this represented a congenital form of muscular dystrophy. Bramwell,[16] in 1922, noted a myopathic process limited to the quadriceps. This distinct localization has been reported a number of times.[17-19] In addition, Barnes,[20] in 1932, described, in a single family, a peculiar myopathy characterized by initial true hypertrophy (and increased muscle strength) followed by pseudohypertrophy and terminal atrophy. Also, Nevin[21] commented on a muscular degeneration occurring in late adult life. Such late-life cases have been observed repeatedly.[22-26]

In addition to the above, there are recognized a group of primary myopathies in which failure of immediate relaxation (myotonia) is an important symptom. Thomsen,[27] in 1876, reported on this condition, both in himself and members of his family. The name myotonia congenita was given to the disease.[28] In some cases cold brings on the myotonic state.[29] The disease begins early, sometimes at birth, and the entire voluntary musculature is hypertrophic with little or no muscular wasting.[30] However, De Leage[31] and Hoffman[32] noted patients exhibiting myotonia in which a limited number of muscles exhibited atrophy (myotonia atropica[33]). Batten and Gibbs[34] classed the latter disease as a muscular dystrophy. Steinert[35] gave an independent description of the disease, noting the peculiar distribution of muscle atrophy which primarily involved the muscles of the face, sternomastoids and muscles of the forearm. In addition, he drew attention to the often associated cataract, baldness and reduced potency. Greenfield[36] also described the disease in a family of 13 brothers and sisters, five of whom were affected. Up to 1912, the atrophic form was considered to be a special form of Thomsen's disease. In 1912, Curschmann[37] recognizing the importance of the extramuscular symptoms, suggested that this was a distinct myopathy and gave it the name dystrophia myotonica.

Thus, the classical descriptions of this group of diseases divided the muscular dystrophies into the (1) pseudohypertrophic [Duchenne]; (2) atrophic pelvic-girdle [Leyden - Moebius]; (3) facioscapulohumeral [Landouzy - Dejerine]; (4) juvenile scapulohumeral [Erb]; (5) distal [Gowers]; (6) ocular [Hutchinson, Fuchs]; (7) Barnes type [Barnes]; (8) late-life form [Nevin]; (9) myotonic form [Steinert, Curschmann].

While accurate description of the many clinical varieties of muscular dystrophy certainly has merit, the procedure not only becomes troublesome and unwieldy for practical use but the distinction between the various groups may be artificial and inaccurate. Walton[1] considers the Barnes form to have been a variant of dystrophia myotonica. Many patients in the category described by Nevin (and others) may be suffering from a polymyositis. For instance, Garcin and Lapresle[38] obtained complete recovery with cortisone therapy and Gentili and Corsi[39] reported improvement in seven out of 14 patients. In addition, setting aside those cases exhibiting pseudohypertrophy as representing a distinct form of muscular dystrophy[40] is not completely satisfactory for cases with pseudohypertrophy may show marked clinical differences[41] and pseudohypertrophy may occur at any age.[42]

Since the etiology of this group of myopathies is only vaguely suspected and since no known treatment is available, it may appear unimportant to be concerned with types and classification. Nevertheless, the different varieties of the disease show such great variability in the

progress, invalidism, and age at death, that classification becomes of importance in assessing the prognosis.

PRESENT CLASSIFICATION

That muscular dystrophy is an hereditary disease has been known since it was described by Gowers in 1879.[43] Weitz,[44] Bell[45] and Milhorat and Wolf[46] made earlier contributions in this regard. More recently, significant contributions have been made by Tyler and Stephens[47, 48] in Utah, by Levison[49] in Denmark, and by Stevenson[50] in Ireland.

In 1954, Walton and Natrass[51] in England, in a compelling paper, authoritatively laid the foundation for a classification of the muscular dystrophies on genetic and clinical grounds. These authors first separated the "pure" muscular dystrophies from the myotonic syndromes. Then, excluding the Barnes type and the Nevin late-life type (for reasons given above), they classified the muscular dystrophies into six types. The three most prevalent types were (1) Duchenne type muscular dystrophy, (2) limb-girdle muscular dystrophy, and (3) facioscapulohumeral muscular dystrophy. The ocular, congenital and distal forms were included as distinct forms of rare occurrence.

Genetic analysis generally seemed to support this classification.[52, 53] Chung and Morton[54] and Morton and Chung[55] using discriminant functions of 18 variables based on history, physical findings and laboratory data in a large series of cases in Wisconsin and the literature, added a sporadic group to the Walton and Natrass classification of the limb-girdle autosomal recessive type. The sporadic group comprises about 40 percent of all limb-girdle cases; it differs genetically but not clinically.

TABLE 2
Classification of the Muscular Dystrophies

I. Duchenne type muscular dystrophy
A. Sex-linked muscular dystrophy
a. severe
b. mild
B. Autosomal recessive form
II. Limb-girdle muscular dystrophy
A. Autosomal recessive form
B. Sporadic form
III. Facioscapulohumeral muscular dystrophy
A. Autosomal dominant
IV. Distal muscular dystrophies
V. Ocular muscular dystrophy
VI. Congenital muscular dystrophy

The Duchenne type of muscular dystrophy has been the basis for much concern in regard to classification. It is not only the most common form but it is the severest form. Transmitted as a sex-linked recessive trait, the children of a carrier female would exhibit dystrophy in one-half of the boys and the carrier trait in one-half of the girls. The other children would be normal. Hence, it was necessary to explain the occasional appearance of a dystrophy in girls similar to that of the sex-linked recessive type in boys.[57, 58] Minkowski and Sidler[59] in 1928 as well as Hanhart,[60] in 1949, had suggested the possibility of two forms of the Duchenne type; one sex-linked recessive type and the other an autosomal recessive type. Subsequent genetic analysis supported this possibility.[61-63] The autosomal recessive form occurs in about 10 per cent of families exhibiting the Duchenne form of muscular dystrophy[64] and could account for the occasional expression in the female.[65] Several studies[66-68] have shown the autosomal recessive type to be later in age of onset (6 to 18 years), a slower progression, longer life span (35 to 50 years) than the sex-linked variety.

It seems reasonable on genetic grounds to consider the sex-linked recessive and the autosomal recessive type of muscular dystrophy as two distinct diseases. Indeed, Becker[66] placed the Duchenne autosomal recessive form under the limb-girdle autosomal recessive type. Chung, Morton and Peters[68] also regard these cases as examples of limb-girdle dystrophy of early onset. The fact that they are clinically similar to the sex-linked recessive type of Duchenne, has led Zundel and Tyler[69] to caution that defective enzyme synthesis at any one of several steps in a long metabolic chain could result in a similar anatomic or physiologic abnormality.

Within the sex-linked recessive type of muscular dystrophy, some individuals show a disease with a more benign course, so that some of the patients survive well into middle life.[70] Becker and Kiener[71] first described an X-chromosomal variety with age of onset between 6 and 18 years in which inability to walk was delayed as late as 50 years of age. Dreifuss and Hogan[72] also noted an unusually benign form of the X-chromosomal muscular dystrophy in eight members of a family in Virginia. Although, the age of onset was before the fifth year, the age of survival was greatly prolonged; to 52 and 44 years. Recently Mabry, et al.[73] have studied several generations of a family in Kentucky who exhibited an unusual form of the X-chromosomal dystrophy. The age of onset

was from 11 to 13 years with ambulation persisting as late as 25 to 35 years of age. Survival was prolonged; the oldest living member was 35 years old at the time of the study. It is known that there is a slowing of the rate of progression in the postpuberal phase of the disease. To what extent this may alter the course of the disease in some individuals is unknown. Miller, et al.[74] point out that it is not possible by pedigree analysis alone to differentiate between the sex-linked recessive gene and the sex-influenced autosomal dominant gene when fertility is reduced in those males who carry the gene.

Recently, by using serum enzyme levels, the carrier state has been detected in females.[75-77] Clinical and histological abnormalities have been observed in such individuals.[78-81] This may provide a partial answer to the occurrence of the sex-linked Duchenne type of progressive muscular dystrophy in females (manifesting heterozygote). Pearson, et al.[82] explained the findings on the basis of the Lyon hypothesis.[83, 84] It was suggested that the female would be composed of a mosaic of somatic cells, some with mutant X-chromosome and others with normal X-chromosome. The female who is heterozygous for a sex-linked gene would show variation in gene expression in her somatic cells depending on the proportion of active normal or active mutant-bearing X-chromosomes that exist. Two populations of muscle fibers would be present, one normal and the other dystrophic. The presence of a greater number of active mutant X-chromosomes could produce a female with clinical dystrophy.

1. **Duchenne type muscular dystrophy**

A. Sex-linked recessive — severe form

This form is transmitted as a sex-linked recessive trait with a high mutation rate. Analysis shows a prevalence of 38 living cases per million males or an incidence of 160 boys who will develop the disease per million births. The fertility is less than 4 per cent of normal. One third of the cases are sporadic due to new mutations.[87] This is the most common form of muscular dystrophy. Expression is in the male with onset usually in the first three years of life. There is symmetrical involvement of the pelvic musculature; later (3 to 6 years) the shoulder girdle is involved. Pseudohypertrophy, particularly of the calf muscle (sometimes the gluteal, quadriceps or deltoid), occurs in 80 per cent of the cases. The first symptoms are slowness in walking, clumsiness and frequent falling, and difficulty in rising from the floor. There is

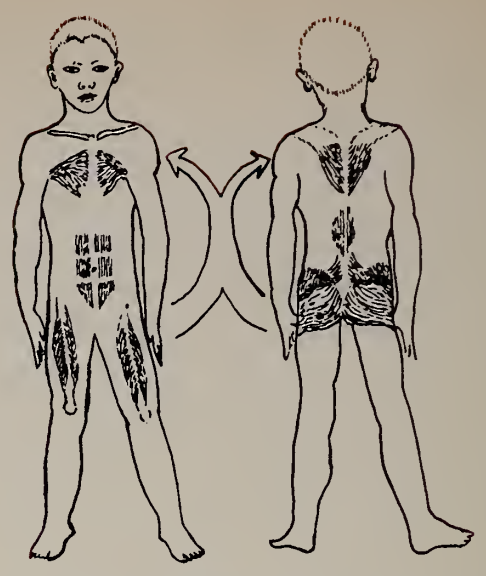


Figure 1. Initial muscle involvement and direction of spread in the Duchenne sex-linked form of muscular dystrophy.

steady and rapid progress of the disease leading to inability to walk within 10 to 12 years of age. Progressive deformities with contractures occur. Death, due to respiratory complication or cardiac failure, occurs before the age of 20 years. Gallora and Lavitola[85] and Lewis and Besant[86] reported the involvement of the diaphragm in the dystrophic process.

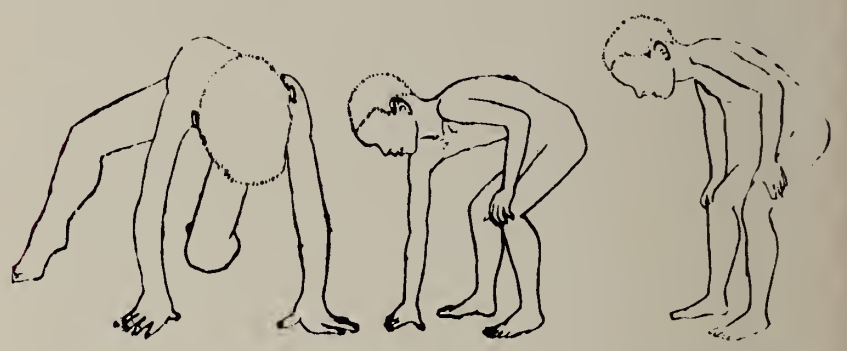


Figure 2. The characteristic method of walking up the legs when arising from the floor (Gower's sign) in the Duchenne type muscular dystrophy. Pseudohypertrophy of the calf muscles is usually present.

b. Sex-linked recessive — mild form

This form is transmitted as a sex-linked recessive trait. Approximately one fourth of the cases are sporadic.[87] Analysis indicated a prevalence of 4 living cases per million males or an incidence of 18 boys who will develop the disease per million births. Expression is in the male with onset at age 4 to 5 years,[72] 11 to 13 years,[73] 6 to 18 years[66] or later.[87] There is symmetrical involvement of the pelvic musculature with later (5 to 10 years) mild involvement of the shoulder muscles. Pseudohypertrophy may[73] or may not[72] be a prominent feature. Inability to walk is delayed until middle life although the patient is severely disabled. All of the sex-linked recessive mild forms of the Duchenne type described by Dreifuss and Hogan,[72] by Mabry, et al.[73] and by Becker[87] have been included in this category. To what

extent each represent distinct varieties, as Mabry, et al.[73] suggest, is not known.

B. Autosomal recessive type.

This type of Duchenne muscular dystrophy is transmitted as an autosomal recessive trait, thus accounting for this form of the disease in females. It occurs in about 10 per cent of the cases exhibiting the Duchenne type of dystrophy. Analysis indicates a prevalence of 7 living cases per million or an incidence of 30 individuals who will develop the disease per million births. The age of onset is from 5 to 13 years but the progress of the disease is slower than the sex-linked variety. Although severely disabled, many of the patients are still able to walk until the age of 25 years and may survive until 40 to 50 years of age. This autosomal recessive type of muscular dystrophy has been included in the Duchenne type according to Walton[88] although Becker[66] and Morton and Chung[55] place it in the limb-girdle classification with early onset.

2. **Limb-girdle muscular dystrophy.**

This type of muscular dystrophy includes Erb's scapulohumeral type, adult cases of the traditional Leyden - Moebius pelvic girdle type and a few cases of muscular dystrophy which develop in later life. It is transmitted as an autosomal recessive trait affecting both sexes (about 40 per cent of the limb-girdle form are sporadic). The prevalence rate occurring in the homozygote was calculated at 20 living cases per million or an incidence of 47 persons who will develop the disease per million births. The fertility is 25 per cent of normal. Signs of weakness may appear first in the shoulder girdle, later spreading (10 to 20 years) to the pelvic musculature. Weakness may begin in the pelvic musculature, later spreading (10 years) to the shoulder girdle. Age of onset may be late or early (10 to 50 years) but usually occurs between the age of 20 to 30 years. Pseudohypertrophy may be present in some cases but it is much less common than in the Duchenne variety. Severe disability after middle life and a shortened life span can be expected.[89] Alveolar hypoventilation has been reported.[89a] The sporadic type would rarely give secondary cases in other members of a family. Data on the sporadic type show an incidence of 33 cases who will develop the disease per million births or a prevalence of 14 cases per million.

3. **Facioscapulohumeral muscular dystrophy.**

This type of muscular dystrophy is transmitted as an autosomal dominant gene with expression in either sex. The prevalence was calculated to be approximately 6 living cases per million, or an incidence of 5 persons who will develop the trait per million births. The fertility is near normal. The age of onset is usually in adolescence but can occur anywhere from childhood to late adult life. There is initial involvement of the face and shoulder girdle muscles with subsequent spread (20 to 30 years) to

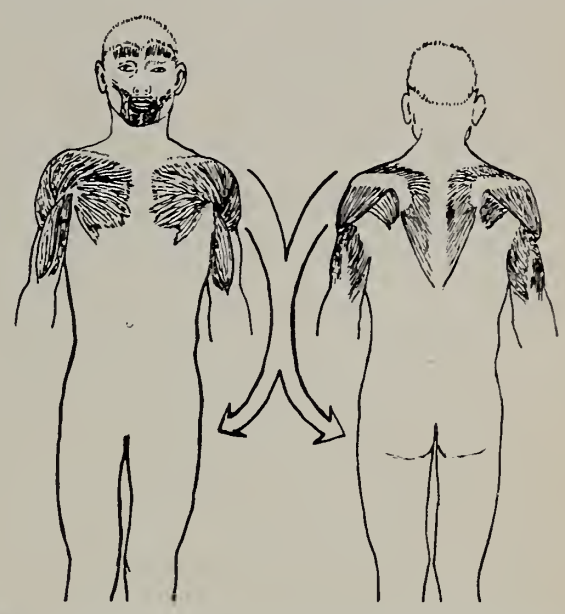


Figure 3. Initial muscle involvement and direction of spread (late) in the facioscapulohumeral type of muscular dystrophy.

the pelvic girdle. The progress of the disease is slow and years of arrest may occur. Facial involvement gives an inability to whistle and a typical pout to the lips. Abortive or mildly affected cases are common. Pseudohypertrophy of muscles is uncommon. A normal life expectancy can be expected in this form of the disease.[47, 89]

4. **Distal Muscular Dystrophy.**

This form of muscular dystrophy was reviewed by Welander.[90] The disease is transmitted as an autosomal dominant trait and affects both sexes. It may begin between the ages of 20 to 80, usually between 40 and 60 years; mean 47 years. The disease begins in the small muscles of the hands or feet with weakness and wasting of the extensors of the toes or more commonly the extensors and flexors of fingers. There is difficulty in using the small muscles as in buttoning buttons or in picking up small coins. The disease spreads slowly proximally and some wasting of proximal muscles may be evident 10 years after onset. In some cases, spread to proximal muscles does not occur. The disease is rare outside of Sweden, although Dahlgaard[91] reported a case in Denmark and Walton, et al.[92] remarked on six cases in England. Barrows and Duemler[93] reported a case in Los Angeles, a 67 year old man, who had been born in Sweden, although he had lived in the United States for 30 years.

5. **Ocular Muscular Dystrophy.**

This form of muscular dystrophy was extensively reviewed by Kiloh and Nevin[94] and more recently by Lees and Liversedge.[95] It is transmitted as an autosomal dominant trait. The condition usually begins with bilateral ptosis and restriction of the eye movements. Diplopia may or may not be present. Onset may be at any age from 17 to 50 years.[94, 95, 96] Sevel[97] described a case, a male Bantu, whose first symptoms appeared at the age of 3 years. The disease may spread to involve the neck and shoulder muscles. The orbicularis oculi are the most severely affected. While the disease shows a slow relatively benign course, Stojanow[98] reported a case in which the disease began in a 66 year old male and in 6 months atrophy and disturbed function had spread to the face and neck muscles. Dysphagia occurs in approximately 50 per cent of the cases.[99]

6. **Congenital Muscular Dystrophy.**

This disease is one of a group which the late Dr. J. C. Greenfield termed "the floppy infant" because of the hypotonia and weakness appearing at birth or shortly thereafter. The group had been classified broadly under three headings:

(a) Progressive infantile muscular atrophy (Werdnig-Hoffman disease) due to reduction in the number of ventral horn cells.

(b) Amyotonia congenita (Oppenheim) — general hypotonia with weakness but no wasting. Possibly due to delayed muscular development or delay in maturation of ventral horn cells.

(c) Congenital muscular dystrophy (Batten).

Batten[15] first suggested that the hypotonia at birth found in certain individuals represented a true myopathy. Recently Turner and Lees[100] had an opportunity to examine three surviving members, after 20 years, of a family of which six of 13 siblings were affected. Two had been reported by Batten[101] in 1915. The children were extremely hypotonic in infancy. There was little voluntary movement of legs until they were 18 months old. The mother reported that fetal movements were late in starting. At two years they started to propel themselves along on the buttocks. As the children grew older the hypotonia lessened and disappeared but weakness appeared. The sternomastoids, pectorals, and trapezii were the most affected. The serratus magnus, spinati and deltoids were less involved. In these cases, the muscular weakness and wasting had apparently been stationary for many years.

During the last several years, histochemical techniques and electronmicroscopy has led to the separation of three distinct muscle disorders which previously probably would have been classified as congenital muscular dystrophy. In 1956, Shy and Magee[101a] described a congenital non-progressive myopathy in five patients of three generations (4 males, 1 female; ages 2 to 65). The pattern of inheritance was that of an autosomal dominant[101a] or recessive[101g] mechanism. The disease was present at birth or shortly thereafter with a history of reduced fetal movements. The main clinical features were delayed motor development, bizarre postures, delayed walking until age 4 or 5, difficulty climbing stairs and rising from the floor. Muscle wasting was not a common feature. Histological study revealed a central amorphous non-staining core in the center of each fiber (some fibers had as many as six central cores [101b]). This "central core" disease has been described a number of times since[101b-101g]. The central core is devoid of oxidative enzymes and phosphorylase and devoid of mitochondria and sarcoplasmic reticulum. The central core appears in those fibers with high oxidative activity[101g].

In 1963, Shy, Engel, Somers and Wanko[101b] reported on a congenital, non-progressive myopathy in a four year old girl. Histological examination of a biopsy specimen revealed subsarcolemmal aggregates of minute rod shaped material. This disease was called "nemaline" myopathy. Several cases have been reported since[101i-101k]. In the electron microscope, the rod like bodies were found to be composed of abnormal fibrillar protein material within the sarcoplasm. The rods were ATP'ase negative (hence not myosin) nor was there fluorescence when sections were incubated with fluorescent labelled antibody to myosin. Price, et *al.*[101k] showed that the excessive fibrillar material was formed at the Z band and suggested that it represented excessive production and accumulation of tropomyosin within the fiber. Afifi, et al.[101l] reported a case that appeared to have both central core disease and nemaline myopathy.

Recently, Dr. Shy has encountered a third type of myopathy in an eight year old girl who had had muscular weakness of the proximal girdle muscles and the muscles of the neck for about three years. There was no marked muscular wasting. Electron microscopy revealed the presence of altered mitochondria and unusual organelles containing odd rectangular bodies.

It is interesting that Banker, et al.[102] noted that the histological findings in two cases of arthrogryposis multiflex resembled muscular dystrophy. Pearson and Fowler[103] suggest that muscular dystrophy in the prenatal period associated with overgrowth of endomysial and perimysial connective tissue may combine to cause this condition.

7. **Dystrophia myotonica**

Elkington and Goldblatt[104] and Walton[51, 105] separate dystrophia myotonica from the progressive muscular dystrophies. Adie and Greenfield[106] gave an extensive review of the subject. These authors concluded that dystrophia myotonica was a separate and distinct primary myopathy. Maas and Paterson,[107] on the other hand, after a careful analysis felt that myotonia congenita, paramyotonia and dystrophia myotonica were but different stages of the same disease. The question is not fully resolved.

The disease is transmitted as an autosomal dominant trait[108]. The age of onset is usually between 20 and 35 years; occasionally it occurs late in teen-age and in rare instances even earlier[109]. Myotonia may precede by several years the weakness and atrophy. There develops a myopathic facies and alteration of speech. Muscular atrophy may be general but occurs greatest in the sternomastoids, temporal, the muscles of the forearms and the muscles on the anterolateral aspect of the legs. Myotonia is most prominent in the small muscles of the hand (hand grasp), the muscles of the forearm and the muscles of the tongue[107]. There may be associated cataract, baldness, atrophy of the testicles with loss of sexual power, acrocyanosis and increased secretion of tears. The course of the disease is usually relatively slow, death occurring between 45 and 55 years. While there is evidence of testicular atrophy and gonadal failure, the remainder of the endocrine system appears normal[110]. Radiographic examination show thickening of the skull[111] and small pituitary fossa[110]. Cardiac abnormalities[111], respiratory abnormalities (hypoventilation)[112], mental backwardness and abnormal electroencephalographic findings[113] are common in this disease. Adie and Greenfield[106] have pointed out that in an unusually large number of cases, the patients were proficient in athletics (long distance walkers, professional football, fleet as a squirrel, could walk for miles).

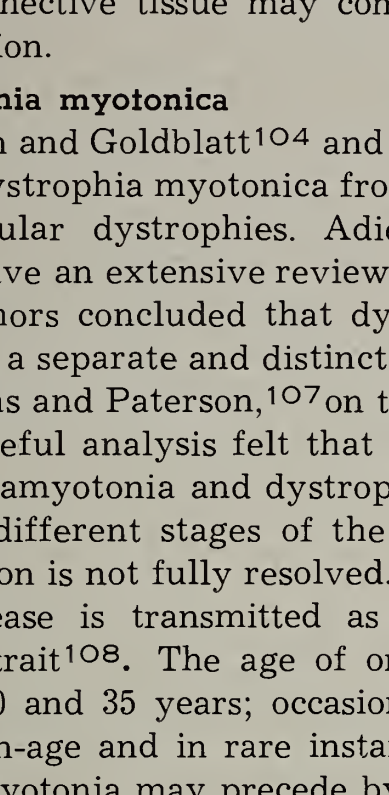


Figure 4. Muscular atrophy in dystrophia myotonica.

HISTOPATHOLOGY OF MUSCULAR DYSTROPHY

The histopathological characteristics of the muscular dystrophies are similar in all types of the disease, although, as Russell states[114], there may be little correlation between the histological picture and the clinical disability. Both Nevin[115] and Mumenthaler[116] discussed the limitations and uses of muscle biopsy and Pearson[117] carefully defined what histological changes may be expected in samples taken from routine autopsies.

The histopathological changes observed in muscular dystrophy have been recorded by Shank, et al., [118] Bowden and Gutman[119] and more recently by Pearce and Walton[120] in a carefully detailed series. The histopathological changes observed in a fully developed case of muscular dystrophy may be summarized as follows:

1. Marked variation in fiber size. This is due to random enlargement and atrophy occurring in adjacent fiber bundles. Enlargement of the fibers appear to be an early and prominent feature. The fiber enlargement appears to be part of the dystrophic process[121] and not, as Walton and Adams[122] earlier suggested, a compensatory hypertrophy of normal fibers. The presence of many hypertrophied fibers is a sign of more rapid progression of the disease.[123]

2. Necrosis. There is disruption of the fiber contents with loss of myofibrillar definition. The sarcoplasm is uniformly stained and deeply eosinophilic. There is later invasion of histiocytes.[124]

3. Regeneration. While this has occupied the attention of many workers it still presents many

difficulties. There are apparently two basic processes described in regeneration of skeletal muscle fibers. The first process is defined as discontinuous regeneration (new myoblasts) which appears to involve the production of undifferentiated mononucleate cells (myoblasts) at the site of injury.[125, 126] The fusion of such myoblasts to form syncytial myotubes and the formation of new myofibrils in them has recently been described in an electronmicroscopy study by Allbrook.[127] The second process is described as continuous regeneration (sarcoplasmic outgrowths), in which sarcoplasmic outgrowths (buds) form from the old muscle fibers.[128] Le Gros Clark[129] is of the opinion that this is the only method of regeneration. Although Litver[130] remarked that the type of regeneration depends on the type of injury, Shafig and Gorycki[131] observed both types of regeneration in heat injured skeletal muscle of mice. In any event, the histological evidence of muscle regeneration is well known.[122] Some reports[123] deny the existence of regeneration in progressive muscular dystrophy. Indeed, Denny-Brown earlier suggested that the inability of the muscle cell to regenerate constituted the essential defect.[132] However, recent studies show that the presence or absence of regenerative activity depends only on the stage of the disease at the time of observation.[120, 122] Walker and Drager[133] observed regeneration in muscular dystrophy and in preclinical cases of muscular dystrophy (biopsy taken before clinical signs of weakness and atrophy), regenerative activity was a prominent feature although this declines as the disease progresses.[134] Tissue culture of dystrophic muscle showed only abortive regeneration.[121]

4. Hyaline degeneration. This form of degeneration is more common than granular degeneration.

5. Splitting of muscle fibers. Splitting or forking of muscle fibers into daughter fibers each with a distinct sarcolemma and within the same endomysial tube is a frequent finding in muscular dystrophy.

6. Ring forms. Ringebinde or striated annulet, as described by Heidenhain in 1918,[132] have been described frequently[136, 137] and their validity established.[138] Such forms were at one time thought to be pathognomonic for dystrophia myotonica, but it is known that they are found in other types of muscular dystrophy[139] as well as in normal muscle.[140]

7. Increased numbers of sarcolemmal nuclei with central nucleation. This is particularly evident in dystrophia myotonica and Walker,[126] in a beautifully executed experiment, suggested that central nucleation was the result of regenerative activity.

8. Increased fat and connective tissue. The invasion of fat and connective tissue into the degenerating muscle mass has been known since Griesinger[141] first made a surgical biopsy in 1865. Duchenne,[142] in 1868, and Erb,[143] in 1891, were well aware of this histological process. O'Steen[144] reported that human dystrophic thigh muscles cultured in diffusion chambers inserted into the peritoneal cavity of mice showed a greater proliferation of connective tissue elements than normal muscle similarly cultured. This suggests that connective tissue abnormality may be part of the disease as Bourne, et al. suggested.[145]

All of the above histological characteristics are to be found more or less, in all types of muscular dystrophy. Pearce and Walton,[120] in a study designed specifically to determine whether biopsy findings could be used to differentiate between the clinical varieties of muscular dystrophy, concluded that it was impossible on histological grounds to distinguish between the individual non-myotonic varieties of muscular dystrophy. However, the greater increase in sarcolemmal nuclei with inward migration into the central substance of the muscle fiber, nuclear chain formation and more prominent ring formation could be used to differentiate dystrophia myotonica from the non-myotonic varieties. (See Wohlfart[145a]).

Recently, Daniel and Strick[145b] found abnormal muscle spindles in dystrophia myotonia. There was a great increase in the number of intrafusal fibers (up to 60, normal 5 to 14) and diminution of their size, apparently due to splitting. They suggest that this leads to abnormal discharges and abnormal reflex activity. Denny-Brown and Nevin[145c] earlier had suggested that a single stimulus may produce a repetitive discharge in myotonia although they attributed this to an abnormal fiber membrane. Certainly, increasing the external K+ brings on myotonia[145d] and a decrease in K+ or increase in Ca++ abolishes myotonia.[145e]. MacDermot[145f] reported abnormal nerve terminals and profuse terminal branching in dystrophia myotonica. The EMG revealed high frequency discharge at rest.

SERUM ENZYMES IN MUSCULAR DYSTROPHY

Following the report of Sibley and Lehninger,[146] in 1949, that serum aldolase concentra-

tions were elevated in progressive muscular dystrophy, numerous enzymes have been studied. In the past, serum levels of aldolase, lactate dehydrogenase, and to a less extent glutamic oxalacetic transaminase have proved helpful in diagnosis and prognosis.[147-149] Most workers agree that the serum enzyme activity decreases as the disease progresses due to destruction of muscle.[150] The earlier the disease[150, 151] and the more rapidly progressive the disease,[152, 153] the higher the serum aldolase concentrations. While many investigators have relied on the serum aldolase level as a reliable diagnostic test,[154-156] it is appreciated that this enzyme may show an elevation in the serum of patients suffering from a variety of diseases,[157] particularly liver disease.[158-160] Differences in specificity for fructose-1-phosphate substrate can be used to determine the origin of aldolase (muscle or liver),[161] i.e., liver aldolase acts upon both fructose-1:6-diphosphate and fructose-1-phosphate while muscle aldolase acts on fructose-1:6-diphosphate only.

In 1959, Ebashi, et al.[162] found a pronounced elevation in serum creatine-phosphokinase (CPK) activity in muscular dystrophy. This observation has been confirmed.[163, 164] Since the enzyme is absent from liver and red blood cells,[165] added significance may be placed on its determination in skeletal myopathies,[166-168] although there is a transient elevation in myocardial infarction.[169-172] Recent work suggests that it may be possible to identify the serum enzyme as skeletal or cardiac in origin.[173]

The enzyme catalyzes the reversible reaction[174, 175]:

$$\text{creatine} + \text{ATP} \xrightleftharpoons{\text{CPK}} \text{ADP} + \text{creatinephosphate}$$

It should be pointed out that the pH optimum for the reaction, $\text{Cr} + \text{ATP} \xrightarrow{\text{CPK}} \text{ADP} + \text{CrPO}_4$, is 9.0 to 10.5, quite outside the physiological range. Indeed, at the pH of the cell (6.8) and the concentrations of CrPO_4 and ATP in muscle, the reaction wouldn't proceed at all. The reverse reaction would occur, $\text{CrPO}_4 + \text{ADP} \xrightarrow{\text{CPK}} \text{ATP} + \text{Cr}$, which has a pH optimum of 6.9 to 7.0.

There are several methods available for measuring creatinephosphokinase activity:

(a) Measurement of the creatine formed from creatinephosphate in the reaction: $\text{CrPO}_4 + \text{ADP} \xrightarrow{\text{CPK}} \text{ATP} + \text{Cr}$.[176]

(b) A pH titration based on the liberation of H^+ ions formed when ATP converts to ADP in the reaction: $\text{Cr} + \text{ATP} \xrightarrow{\text{CPK}} \text{ADP} + \text{CrPO}_4$.[177, 178]

(c) Measurement of pyruvate formation in a coupled reaction with phosphoenolpyruvate:

$$\text{Cr} + \text{ATP} \xrightarrow{\text{CPK}} \text{ADP} + \text{CrPO}_4$$

$$\text{ADP} + \text{P-Pyr} \xrightarrow{\text{Pyr K'ase}} \text{ATP} + \text{Pyruvate}$$

The pyruvate is measured with 2:4-dinitrophenyl-hydrazine in alkaline solution.[179]

(d) Measurement of the change in absorbency at 340 mu when DPN is formed from DPNH in a coupled reaction with phosphoenolpyruvate[180]:

$$\text{Cr} + \text{ATP} \xrightarrow{\text{CPK}} \text{ADP} + \text{CrPO}_4$$

$$\text{ADP} + \text{P-Pyr} \xrightarrow{\text{Pyr K'ase}} \text{ATP} + \text{pyruvate}$$

$$\text{Pyruvate} + \text{DPNH} + \xrightarrow{\text{Lactate dehydrogenase}} \text{Lactate} + \text{DPN} +$$

(e) Measurement of the change in absorbency at 340 mu when TPNH is formed in a coupled reaction with glucose and hexokinase[181]:

$$\text{CrPO}_4 + \text{ADP} \xrightarrow{\text{CPK}} \text{ATP} + \text{Cr}$$

$$\text{ATP} + \text{glucose} \xrightarrow{\text{hexokinase}} \text{glucose-6-PO}_4$$

$$\text{glucose-6-PO}_4 + \text{TPN} \longrightarrow \text{6-phosphogluconate} + \text{TPNH}_2$$

Rotthauwe, et al.[182] have compared these methods and recommend method (d) above, that of Tanzer and Gilvarg.[180] While this method is widely used, it does require the use of a spectrophotometer accurate in the near ultra-violet range (340 mu) which may not be available in some laboratories †. For this reason, the method in (a) above is often used. This method measures the creatine formed from creatine phosphate. Creatine is usually measured by the a-naphthol-diacetyl reaction as described by Eggelton, et al.[183] and modified by Ennor and Stocken.[184] Nichol[185] claims high sensitivity for this method as outlined by Dreyfus and Schapira[186] if thiols are added to the test procedure. The values reported by Dreyfus, et al.,[187] may be too low for this reason. Aebi, et al.[189] used the reverse reaction; $\text{ATP} + \text{Cr} \xrightarrow{\text{CPK}} \text{ADP} + \text{CrPO}_4$, and measured ADP by a sensitive spectrophotometric method.[189]

† Calbiochem, Box 54282, Terminal Annex, Los Angeles, California 90054 (or in the midwest, P. O. Box 297, Wood Dale, Illinois) supplies an inexpensive instrument ($295.), the Calbiometer, specifically designed to measure spectral changes at this wave length.

The method was sensitive although a high incidence of false positives were reported. Several companies supply the reagents for these tests in kit form*.

An unfortunate characteristic of serum creatine-phosphokinase encountered in some of the earlier work was the rapid decline in activity during storage.[190] As the properties of the enzyme had been well studied,[191] it seemed reasonable to suspect that the decrease in activity was due to oxidation of enzyme thiol groups. Indeed, Chapell and Perry,[192] in 1954, had used cysteine to stabilize the reaction and Hughes[193] adapted this to the creatine method of Ennor and Stocken for determination of creatine-phosphokinase in serum. Okinaka, et al.[194] and Kar and Pearson[195] also showed that serum creatine-phosphokinase activity could be enhanced and the accuracy and reproducibility increased by the addition of a number of sulfhydryl compounds to the reaction medium; cysteine, reduced glutathione, mercaptoethanol. Nichol[185] prefers reduced glutathione as she feels this gives more reliable results.

When proper precautions are taken in the test, serum creatine-phosphokinase appears to be the

* Calbiochem supplies reagent for the Tanzer and Gilvarg method (d, above), item No. 8876, CPK-test sufficient for 10 determinations. Item No. 869014. Creatine phosphokinase Calsuls, sufficient for 6 tests per box. The latter test is that of Oliver (e, above).
Sigma Chemical Co., 3500 De Kalb Street, St. Louis, Mo. 63118 supplies reagents for the Tanzer and Gilvarg method as item No. 40-UV creatine-phosphokinase, sufficient for 15 determinations. Sigma also supplies item No. 660 creatinephosphokinase colorimetric. This test is based on a phosphorus determination.

TABLE 3
Serum Creatinephosphokinase Levels

Type of Patient	Age	Age Onset	Serum CPK activity uM of creatine/ml/hr at 37°C* Mean	Range
Normal				
Children	0 to 1 yr.		3.6	3.0 to 4.5
	1 to 5 yr.		2.8	0.9 to 6.2
	5 to 10 yr.		1.6	
Females	(adult)		1.7	1.0 to 4.0
Males	(adult)		1.5	0.4 to 3.6
Muscular Dystrophy				
No clinically detectable muscle disease but have brothers with the Duchenne type muscular dystrophy	9 to 14 mo.			792 to 1,060
	2 to 4 yr.			300 to 870
Duchenne M.D.	4 to 15 yr.	1 to 9 yr.		70 to 962 (max. in younger age group)
Limb-girdle M.D.	17 to 49 yr.	14 to 23 yr.		1.6 to 99 (4 out of 6 had high levels.)
Facioscapulo-humeral M.D.	20 to 47 yr.	20 to 35 yr.		3.8 to 17.8
Carriers of M.D.				
Known	32 to 71 yr.			1.8 to 5.7
Probable	28 to 51 yr.			2.3 to 51.8
Possible	2 to 47 yr.			1.8 to 99.0
Dystrophia myotonica	19 to 40 yr.	18 to 38 yr.		2.9 to 9.0 (5 out of 7 elevated)

* The unit of CPK activity is defined as the amount of enzyme which will catalyze the transformation of one micromole of substrate per 1000 ml of serum in one minute at 25°C. The results can be expressed as milliunits (mU) per ml of serum.

most sensitive indicator available for detection of early Duchenne type muscular dystrophy,[196-198] for carriers,[75. 76. 199-203] and for detection of preclinical asymptomatic infants who will later develop the disease.[204-207]

Pearce, et al.,[208-210] in a thorough study, determined the creatine-phosphokinase activity that may be expected in normal, muscular dystrophy, carrier, and preclinical muscular dystrophy individuals. Table 3 is taken from their data.

While the CPK values may be normal or slightly elevated in the limb-girdle and facioscapulohumeral form of progressive muscular dystrophy, it is consistently elevated in the Duchenne type. A correlation is found between CPK elevation, the age of the patient, and the severity of the course of the disease. Highest values are observed in the early stage of the disease. Indeed, the highest values are found in preclinical cases (no evidence of muscular weakness) and have been observed as early as 4 months of age. Such information is invaluable for prognosis and gives a powerful tool for study of the disease in its early stages. A number of investigators have used the serum CPK levels to uncover carriers and preclinical cases of the Duchenne type of progressive muscular dystrophy and have studied the early stages of the disease by histochemical means.

HISTOCHEMISTRY OF MUSCULAR DYSTROPHY

In the last 16 years reliable techniques have been developed for the histochemical demonstration of a variety of muscle enzymes. When these techniques were applied to **normal** skeletal muscle some fibers reacted strongly to tests for oxidative enzymes and some fibers reacted strongly to phosphorylase stains.[211, 212] There appeared to be a reciprocal relationship between oxidative enzymes and phosphorylase enzymes in individual fibers; fibers showing high oxidative enzyme activity reacted only slightly to stains for phosphorylase activity and vice versa. Fibers showing high oxidative enzyme activity were generally smaller than fibers showing high phosphorylase activity. The muscle fibers were divided into two groups on the basis of histochemical staining reactions.[213]

Dubowitz[214] showed that the two histochemically differentiated fiber types were already present at birth in a number of animals including the human (rabbit, guinea pig, hamster, but not in the rat until the 7th day post-partum.) He further demonstrated[215] three phases of skeletal muscle fiber differentiation for the human:



Figure 5. A drawing of a tissue section of a normal muscle stained for lactate dehydrogenase (oxidative enzyme) to show the two types of muscle fibers; small diameter fibers with high oxidative activity (and weak phosphorylase activity) and large diameter fibers with weak oxidative activity (and high phosphorylase).

Phase I — early fetal to 20 weeks gestation, no division into fiber types; Phase II — 20 weeks to 26 weeks gestation, fibers divided into two types but type I comprises only 3% to 10% of the fiber population; Phase III — 30 weeks gestation to full term, equal proportion of type I and type II fibers as in the adult.

It has been known for many years that there are two types of fibers in skeletal muscle; the fast contracting white fibers and the more slowly contracting red fibers.[216] It appears that the smaller slowly contracting red fibers are rich in oxidative enzymes and depend on intermediates of the Krebs cycle for an energy source. The larger fast contracting fibers are rich in phosphorylase and are dependent on intrinsic glycogen stores for an energy source.[217] A functional distinction has been made between these two fiber types; (a) large, pale, glycogen rich, rapidly contracting, fibers for quick phasic movements and (b) small, red, oxidative rich, slowly contracting, fibers for sustained postural activity. Separation of muscle fibers into functional and metabolic types may prove fundamental to the dystrophic process. It is known that muscular dystrophy is characterized by degeneration of scattered muscle groups (in the earlier stages) and that certain muscles are more likely to be affected by the early dystrophic process than others (clinical classification of the muscular dystrophies). Babinski and Onanoff[218] called attention to this fact as early as 1888, suggesting that those muscles in which development was more advanced were predisposed to muscular dystrophy. Bramwell,[219] drawing on the work of Hunter,[220] was inclined to believe that the more primitive postural muscles were predisposed to

TABLE 4
Histochemical enzyme activities in different skeletal muscle types

	Type I (small, red fibers)	Type II (large, white fibers)
DPNH dehydrogenase	high	low
DPN-linked lactate dehydrogenase	high	low
Succinate dehydrogenase	high	low
Cytochrome oxidase	high	low
Non-specific esterase	high	low (rat)
DPN-linked a-glycerophosphate dehydrogenase	medium	medium
Menadione-linked a-glycerophosphate dehydrogenase	low	high
Phosphorylase	low	high
Glycogen	low	high
Myofibrillar ATP'ase	low	high
UDPG-glycogen transferase	low	high

the dystrophic process. Tyler and Wintrobe[221] also commented on this peculiarity. Bonsett[222] related the muscular wasting to those postural muscles which must engage in long periods of sustained activity.

As pointed out above, the functional distinction of muscle fibers (postural or phasic) presumably impose metabolic differences between the muscle fibers and it may be the metabolic difference which determine preferential involvement in the dystrophic process (this appears to be true in "central core" disease[223]). Nevertheless, a word of caution is advisable. It may be premature to draw rigid conclusions as to enzymatic fiber types[224, 225] and observed enzymatic differences may be more an adaptive response than a basic metabolic difference.[226]

In any event, it was hoped that a distinct enzymatic lesion in muscular dystrophy could be revealed by histochemical means. Bourne and collaborators[227, 228] had reported differences in the enzyme activity of the connective tissue in muscle specimens obtained from muscular dystrophy patients and, on this basis, had suggested that the basic defect may exist in the connective tissue rather than in the muscle fiber. However, Dubowitz and Pearse,[229] De-Sibrik and O'Doherty,[230] Dubowitz[231] and Engel[232] could find no enzyme defect or gross deviation from normal when histochemical tests were applied to muscle specimens obtained from muscular dystrophy patients. Whorton, et al.,[233] Miyoshi, et al.[234] and Perkoff[235] found an abnormal myoglobin in the Duchenne and facioscapulohumeral form of muscular dystrophy and Drews and Engel[236] demonstrated by histochemical means what appeared to be myoglobin in the small diameter red type I muscle fibers. From the latter again is implied some biochemical difference in certain muscle fibers which preferentially involves them in the dystrophic process.

BIOCHEMISTRY OF MUSCULAR DYSTROPHY

Creatine Metabolism

One of the earliest biochemical abnormalities observed in muscular dystrophy was the heightened urinary excretion of creatine.[203] Increased urinary excretion of creatine, decreased excretion of creatinine and decreased ability to retain ingested creatine has been one of the most consistent biochemical observations in muscular dystrophy,[237, 238] although the significance remains obscure.

Creatine is formed primarily in the liver[239] by a transfer of the amidine group of arginine to glycine with the formation of glycocyamine.[240, 241] Glycocyamine (guanidoacetic acid) is then methylated at the expense of methionine.[242] Creatine in muscle has been established as the precursor of urinary creatinine,[243, 244] a reaction which must proceed through phosphocreatine.[245, 246] The requirement that creatine must be phosphorylated before it can fulfill its functional role in muscle places considerable importance on this reaction. The elegant experiments of Reuter and Zimmerman,[247] of Benedict, et al.[248] and of Roche, et al.[249] showed that the creatinuria of muscular dystrophy was derived from newly formed creatine which was unable to gain entry into the muscle fiber or at least could not be retained.[250]

It was natural to suggest that the increased creatine excretion and decreased creatinine excretion noted in the urine of muscular dystrophy patients was the result of diminished creatine phosphorylation due to lack of the enzyme creatinephosphokinase.[251, 252] This seemed to be supported by direct measurement of low creatine, phosphocreatine and creatine phosphokinase values in muscle specimens obtained

from muscular dystrophy patients.[253-257] Nevertheless, this interpretation can be questioned on several grounds.[258] It is not easy to explain how deficient creatinephosphokinase production can produce the high serum enzyme levels found in some forms of muscular dystrophy. As the enzyme apparently leaks from abnormal muscle fiber membrane,[259, 260] this would indicate that an abnormal membrane is more closely associated with the basic defect, as Van Breeman's electronmicrographs show.[261]

There appears to be a link between creatine phosphorylation and glucose metabolism. Certainly the creatinuria of starvation[262, 263] and carbohydrate deprivation[264] are well known and, while it may represent a nonspecific response of caloric restriction, it deserves further study. The relation of steroid hormones to carbohydrate metabolism[265] and creatine metabolism[266-268] should be further explored. It would be interesting to study the creatine metabolism in preclinical cases of muscular dystrophy in infants who normally exhibit a creatinuria.[269, 270]

Abnormalities of carbohydrate metabolism have been noted in muscular dystrophy.[271-275] Abnormal urinary excretion of amino acids have been reported,[276-282] although there is no general agreement that any one amino acid is selectively affected. Unusual excretion of glycocyamine has been reported.[283] There is a decrease in potassium and an increase in sodium in dystrophic muscle.[284-287] Gastrointestinal symptoms, constipation, abdominal pain,[288, 289] and acute gastric dilatation,[290, 291] have been reported and should not be overlooked. Endocrine abnormalities[292-297] have been reported but no agreement has been reached as to what role, if any, this plays in the dystrophic process. Changes in serum lipoprotein and glycoprotein[298, 299] have also been reported. Abnormalities of the bones, consisting of narrowing of the shafts and rarefaction of the ends of the long bones resembling an irregular osteoporotic process, appears to be part of the dystrophic process.[300-304]

THE HEART IN MUSCULAR DYSTROPHY

An extensive literature is available showing that the heart is involved in the dystrophic process.[305-309] This is particularly true of the Duchenne type of progressive muscular dystrophy. Hyalinization, granular degeneration, and myocardial fibrosis occur.[310, 311] There is evidence of tachycardia,[312] conduction abnormalities.[313] and congestive heart failure.[314, 315] The most prominent ECG changes are abnormally tall R waves in the right precordial leads, V_1 and V_2 (greater than the S waves), depression of the S-T segment and flat or negative T-waves.[316-324] Skyring and McKusick[325] proposed using the ECG to distinguish the Duchenne sex-linked muscular dystrophy from other forms. They suggest that when the algebraic sum of R and S waves in lead V_1 exceeds the upper limit of normal, the Duchenne sex-linked variety of muscular dystrophy can be distinguished from other varieties of muscular dystrophy.

TREATMENT OF MUSCULAR DYSTROPHY

A great many drugs and preparations have been tried in the treatment of muscular dystrophy; a-tocopherol,[326-329] vitamin B_6,[330, 331] glycine,[332] growth hormone,[333, 334] galanthamine,[335-337] extract from the mucosa of hog stomach,[338] fructose-1, 6-diphosphate,[339] adenosinetriphosphate,[340-342] extirpation of the carotid body,[343] combined ATP and resection of carotid sinus nerves,[344] uridine phosphate,[345] isoniazid,[346] iron preparation,[347] vasodilators,[348] sodium lactate,[349] to name a few. No lasting beneficial effects could be obtained with any of these preparations.

Relying on the anabolic effect of androgens, several workers have reported transitory beneficial results with these compounds,[350-356] but more often controlled trials gave negative results.[357-364] Dowben,[365] in 1963, reported an increase in muscle strength in 8 out of 37 patients treated with 1-methyl-A^1-androstenolone and digitoxin. He felt that some over-all slowing of the progress of the disease occurred under this treatment. Heyck, et al.,[366] Fowler, et al.,[367] and Danowski, et al.[368] could see no improvement with this therapy. Indeed, there seemed to be an acceleration of the dystrophic process.[366]

Thomson and Guest[369] have reported beneficial effects in children suffering from the Duchenne type of muscular dystrophy who received parenteral and oral treatment with a mixture of nucleosides and nucleotides (adenosine, AMP, ADP, ATP, inosine, guanosine, GMP, uridine, UMP and CMP), a preparation known as Laevodosin. This will have to await confirmation. There is general agreement that in cases of dystrophia myotonica, the myotonia can be relieved by quinidine, procaine amide, cortisone, or lowering of the serum potassium.[370-372]

Detection of a dystrophic condition in a number of animals, particularly the mouse, has provided a useful tool for laboratory investigation of the dystrophic state.

MUSCULAR DYSTROPHY IN THE MOUSE

In 1955, A. N. Michelson, E. S. Russell and P. J. Harmen reported a spontaneous myopathic mutation which appeared in their inbred strain 129 mice at the Jackson Memorial Laboratory, Bar Harbor, Maine.[373] The anomaly, characterized by progressive ataxia, atrophy and paralysis beginning in the hind limbs, revealed a histological picture similar to progressive muscular dystrophy in the human. It was called dystrophia muscularis and designated by the symbol **dy.** Inheritance was shown to follow the pattern of an autosomal recessive gene.[374]

The histopathological changes observed in the muscles of this strain of mice are: variation in fiber size, increase in connective tissue, subsarcolemmal nuclear accumulation, vesicular enlargement of nuclei, central nuclear rowing, coagulation necrosis, and regeneration of necrotic segments.[375] Pearce and Walton,[376] in a carefully defined study, concluded that the histopathological picture most closely resembled dystrophia myotonica in the human. In addition, McIntyre, et al.[377] noted that the electromyographic discharge from dystrophic mouse muscle resembled that from human dystrophia myotonica. Nevertheless, there are some important differences to be resolved[367, 378] and results obtained using this strain of dystrophic mice should be applied cautiously to human dystrophy, even dystrophia myotonica.

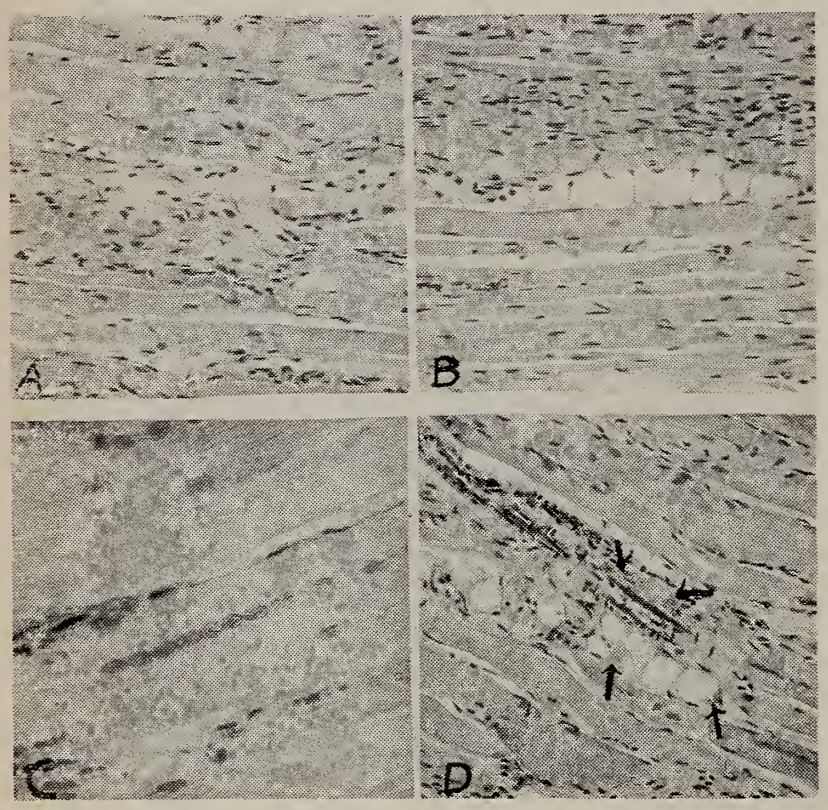


Figure 6. Histopathological changes in muscles from dystrophic mouse. A - Areas of necrosis and phagocytosis of muscle fibers. B - Variation of fiber size, invasion of fat between the fibers. C - Large vesicular nuclei with central migration of nuclei and prominent nuclear rowing. D - Area of necrosis with accumulation of mast cells (arrows). Increase of mast cells in dystrophic mice have been reported in skeletal muscle[375a] and skin.[375b] H & E stain. A, B, D, x 244; C X 410.

Study with the electron microscope has revealed loss of myofibrils, alteration of mitochondria, and distended swollen sarcoplasmic reticulum.[379, 380] Our own studies confirm this (figure 7). In the normal non-dystrophic mouse histochemical studies revealed the usual two types of muscle fibers,[381] although Wirsen and Larsson[382] noted a third type suggesting three populations of fibers. In the dystrophic mouse muscle the succinic dehydrogenase and ATP'ase activity of the large diameter fibers show increasing activity as the animal becomes older, while this activity is generally low in the non-dystrophic muscle.[383] There is rapid disappearance of these large fibers following denervation of the dystrophic muscle[384] implying a susceptibility of these fibers. The histochemical division of muscle fibers into two types is not apparent in the dystrophic mouse muscle[385] apparently due to the increase in oxidative enzyme activity in the large diameter fibers.[383] It is peculiar that this increase in oxidative activity is not reflected in an increase in oxygen consumption of the tissue[386] or in an over-all increase in the metabolic rate of the animal.[387]

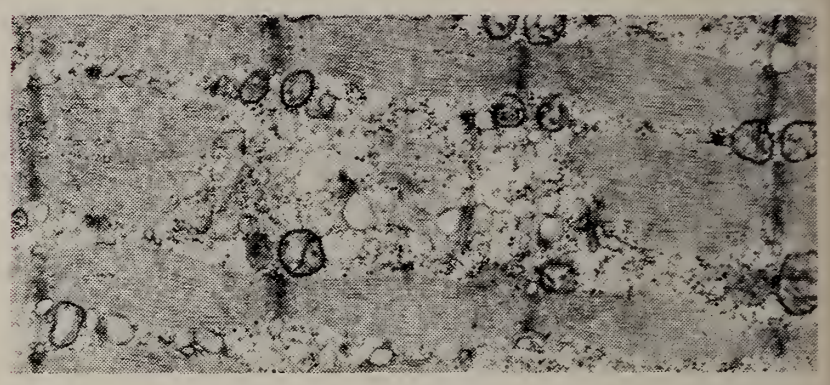


Figure 7. Electronmicrograph of muscle from dystrophic mouse showing area of degeneration and distended swollen sarcoplasmic reticulum. Note the persistence of the transverse tubules and the abnormal mitochondria. The small black dots are glycogen which appears in great abundance in mouse dystrophic muscle. x 34,200

The muscles of dystrophic mice exhibit an extreme sensitivity to anticholinesterase drugs,[388, 389] decreased sensitivity to d-tubocurarine,[390] increased excitability, [391] shortened refractory period,[391] prolonged relaxation period,[392] and a diminished mean resting membrane potential.[393, 394] Many of these responses are probably related to the increased potassium fluxes observed in dystrophic mouse

muscle[395, 396] or to a derangement of calcium sites on the altered sarcoplasmic reticulum.[397, 398] The increased sensitivity to anticholinesterase drugs has been postulated as being due to a decreased cholinesterase activity at the myoneural junction,[399] to increased production of acetylcholine,[400] or to different drug sites.[388] From studies of miniature end-plate potentials, Conrad and Glaser[401] suggested a functional denervation at the myoneural junction as a cause of the dystrophic state. Such a functional denervation had been postulated for myasthenia gravis.[402] In the latter disease disruption of the neuromuscular junction was evident,[403] possibly the result of an autoimmune response.[404-407] While Tal and Leban[405] did produce a dystrophy histologically resembling the muscular dystrophy in mice by injecting homologous and heterologous muscle into rabbits and guinea pigs, the possibility of an autoimmune response as the cause of muscular dystrophy in mice seems unlikely.[409]

Paralleling similar studies made in human muscular dystrophy, many biochemical studies have been made on dystrophic mice. Such studies have revealed: creatinuria[410] (not as severe as in human dystrophy[411]), increased turnover of muscle creatine,[412] increased serum aldolase,[413, 414] low[415] or unchanged[414] serum creatinephosphokinase. A number of muscle enzymes have been studied;[421] aldolase is unchanged[416] or slightly increased,[417] phosphorylase is decreased,[418, 419] but the active form is increased on stimulation.[420] Dystrophic mouse muscle has decreased activity of the DPN dependent dehydrogenases and a great increase in the TPN dependent dehydrogenases.[422] The latter may be related to the increased lipogenesis observed in dystrophic mouse muscle.[423] Our own studies showed that myokinase was decreased in dystrophic mouse muscle (Table 3).

Table 3
Myokinase Activity in skeletal muscle from control and dystrophic mouse muscle

Control	Dystrophic
mM of ATP formed from ADP per gm. non-collagen muscle nitrogen	
1.20 ± 0.07	0.62 ± 0.03

McGaughey[424a] reported that dystrophic mice excreted more a-ketoglutarate in the urine than control mice and suggested that increased glutamic dehydrogenase activity in muscle was responsible. The results could be

1. a-ketoglutarate + CoA-SH + DPN + $\xrightarrow{\text{a-ketoglutarate-dehydrogenase}}$ Succinyl-S-CoA + CO_2 + DPNH + H+
2. glutamic acid-glutamate-dehydrogenase $\longrightarrow$ a-ketogluteric acid + NH_3 + 2H+

due to decreased a-ketoglutarate dehydrogenase or exist as a reflection of increased protein catobolism. In any event, analysis revealed no accumulation of a-ketoglutarate in muscle (Table 4). Indeed we were unable to detect

Table 4
Alpha-ketoglutarate Content of Normal and Dystrophic Skeletal Muscle in Mice

Control	Dystrophic
mg a-ketoglutarate/gm fat free non-collagen nitrogen	
150	0

it at all. Further, analysis revealed a higher level of a-ketoglutarate dehydrogenase in dystrophic mouse muscle than in litter mate controls.

Table 5
Alpha-ketoglutarate dehydrogenase activity in skeletal muscle of control and dystrophic mice

Control	Dystrophic
ul CO_2 evolved per mg fat free, non-collagen nitrogen/4min.	
6.05 ± 0.62	10.04 ± 0.57

Such observations, while important and necessary, have not revealed a specific biochemical lesion as responsible for the dystrophic state. Endocrine studies in this strain of mice have not been fully explored. We are beginning some experiments along these lines in our own laboratory.

Our early studies began with the assumption that the increased urinary excretion of creatine in dystrophic mice (and human dystrophy) was due to defective creatine phosphorylation resulting from a diminished (or absent) enzyme creatinephosphokinase. Determination of this muscle enzyme showed no difference when compared to controls.[424] Therefore, we discarded defective creatine phosphorylation as a significant factor in the mouse muscular dystrophy. Nevertheless, since Nichol, et al.[425] and Nichol[426] have reported low creatine phosphokinase in muscle (and serum[415]) of dystrophic mice, defective crea-

tine phosphorylation still exists as a possible cause.

In any event, we turned our attention to the problem of the role of creatinephosphokinase and phosphocreatine in muscle contraction. We wished to know whether creatinephosphokinase was in any way directly concerned with muscle contraction. It turned out that it apparently was, for analysis showed that the appearance of the enzyme in the developing fetal rabbit skeletal muscle coincided with beginning contractility.[427] It may not be so in heart muscle but these experiments are being repeated using more sensitive tests for the enzyme. It is interesting to note that Carlson and Siger[428] could obtain only one-tenth or less of the normal twitch tension when creatinephosphokinase was poisoned. However, their data can be interpreted in several different ways.

Our approach was directed by recent data on the micromorphology and biochemistry of muscular contraction. H. E. Huxley at Cambridge had firmly established the sliding filament concept of muscle contraction[429] and H. H. Weber in Germany had considered the energetics of muscle contraction within this structural framework.[430] It is generally considered that a high energy phosphate transfer to the protein, actin, is the initial event in muscle contraction. Interaction between actin and myosin then follows (although see Davies[431]).

It appears that phosphocreatine is more intimately concerned with the contractile process than formerly thought.[432-434] Carlson and Siger[428] consider phosphocreatine as localized in a small compartment of muscle concerned with actin polymerization. This is consistent with the results of Hohorst, et al.[435] and with the early observation of Wollemann and Feuer[436] who showed that creatinephosphokinase was closely bound to actin. Strohman[437] reported that phosphocreatine, in the presence of creatinephosphokinase, could act as a phosphate donor to actin bound ADP during depolymerization of actin.[438]

$$\text{G-Actin-ATP} \xrightarrow{\text{CPK'ase}} \text{F-Actin-ADP}$$

$$\text{creatine} \longleftrightarrow \text{CrPO}_4$$

We were able to show that the reverse reaction could occur; creatine could serve as a phosphate acceptor during the conversion of actin bound ATP to ADP during actin polymerization.[439] Carlson has recently reviewed certain of these concepts.[440]

We undertook a study of actin as the possible abnormal component responsible for the inability of the muscle to bind creatine. Reasoning from the work of Baddiley, et al.[441] who suggested that the imidazole residue in an enzyme may be the site for binding of nucleotides and phosphate groups, we measured the incorporation of the carbon-14 labeled amino acid, histidine, into actin.

The results showed a rapid incorporation of histidine into actin of dystrophic muscle (about 3 times the controls) and a rapid degradation of the actin (Figure 8). Similar results have been obtained with myosin using glycine C-14,[442, 443] and leucine-C-14,[444] and indicates a rapid protein synthesis and rapid protein catabolism. As such results could be due to synthesis of an abnormal protein, we undertook an analysis of the amino acid composition of actin and myosin. Our results, still incomplete, suggest that there are differences in the amino acid composition of actin and myosin obtained from dystrophic mice when compared to littermate controls. In myosin, from dystrophic mice, there appears to be an important difference in the -SH groups which could have great functional significance. We are presently pursuing this problem.

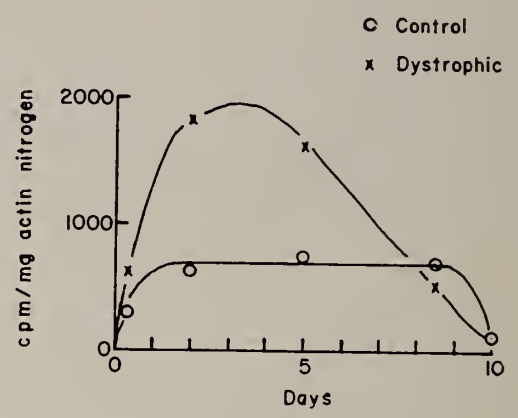


Figure 8. The rate of incorporation of histidine-C^{14} into actin from skeletal muscle of control and dystrophic mice. The plateau in the actin from normal mice indicates the turn-over time of actin (about 10 days). Actin from dystrophic mice shows no plateau but shows a rapid and large incorporation (rapid synthesis) and a rapid continuing degradation of the synthesized actin.

The biochemical abnormality responsible for muscular dystrophy has not been specifically defined by any one study or group of studies. Indeed it is painfully evident that, as yet, no one avenue of approach even appears more promising than others. The discovery of a form of dystrophy in a number of species besides the mouse and human may prove helpful. The intensity and scope of research on muscular dystrophy throughout the world allows one to be cautiously hopeful that a major breakthrough will be accomplished soon.

CONGENITAL DEFECTS

H. Phil Gross, M.D., Sioux Falls, South Dakota

Congenital deformities are not rare. Of all viable births, between four and seven percent have serious or moderately serious developmental abnormalities.

While this number of cases may not seem important in the usual office practice, Geppert[3] found that congenital anomalies, rare types of infections, and new growths accounted for twenty-four percent of hospital admissions and seventy-nine percent of all deaths.

ETIOLOGY

Initially, all congenital anomalies were felt to be due to evil spirits, demons, bad humors, or even punishment by God. Although animal and human experimentation have elevated our thoughts far from this primitive thinking, the thoughts of our patients may not be as advanced as medical science. How often does a young couple, confronted by their deformed offspring, ask themselves what they have done to deserve punishment such as this. Therefore, it behooves us as physicians to understand the etiologic mechanisms of anomalies, that we might illuminate the minds of our patients, rather than allow them to struggle in the dark.

In 1865, Gregor Mendel, a monk at Brno, Czechoslovakia, reported on his experiments made in the monastery garden, on crossing different varieties of kitchen peas.[1] This opened the entire field of heredity and genetics. For some time all congenital anomalies were accredited to some defect in the genes, but as study progressed, this was found untrue. As techniques improved for the study of chromosomes, the discovery of the additional chromosome in the G group in Down's Syndrome, and a previously undescribed syndrome, the Trisomy D's, were reported. These constitute valuable breakthroughs in the field of genetics and represent only a beginning.

Other causes of congenital abnormalities are multitudinous. Many of them are unknown, but animal experimentation with x-rays, vitamin deficient diets, chemicals, drugs, and mechanical effects have all produced defects in the developing fetus. These experiments bring to light the fact that the developing embryo or fetus is subject to many deforming stimuli as it grows.

A specific stimulus, such as the measles virus, may cause an outbreak of measles in a growing child or adult. Yet this same stimulus, the virus, can cause a severe defect in a developing embryo.

This was brought to light in 1941 when Dr. Gregg of Australia noted a large number of cataracts of congenital origin.[4] He was curious and began questioning the mothers about their pregnancies. The common denominator, that of rubella in the first trimester, was thereby discovered. This constituted the basis for one of the first large well documented human "experiments" on congenital anomalies.

The second "experiment" in human teratology followed twenty years later in West Germany. This was at a time when Thalidomide, marketed as Contergon by the Grunenthal Company was readily available to the German public. Many mothers, in their first trimester of pregnancy, took the drug and a number of them gave birth to deformed children. West Germany was by far the most seriously affected, reporting between six and eight thousand cases. By careful documentation of the histories of these mothers, the drug Thalidomide was indicted, and the sensitive period was found to be between the thirty-fourth and fiftieth day after the last menstrual period. This could be further broken down as to a specific day for the radius and thumb, another for the ear, and still another for the femur and tibia.[5]

PREVENTION

With the mounting evidence of causation of congenital anomalies, it is time we make some efforts to prevent them from occurring. Heredity counseling should be made available, and has now reached a state where it can give very accurate advice.

The present mania for ingesting drugs of all sorts by the American public raises another problem for the unborn child. The fine print on many of our "Safe" drugs still reads that these have not been thoroughly tested in pregnant females. The most critical age for the unborn fetus is from two to six weeks, and therefore we could be treating a female before she is aware of her pregnancy.

Two to six weeks is also the most susceptible age of a fetus to x-radiation. And how many x-ray requisitions request the last menstrual period be listed in females of child bearing age? Only after the fetus is six to nine months of age is any care given to irradiating the child, and this is probably at an age when it can best tolerate the x-rays.

The vulnerable time is also before prenatal care is instituted. Therefore, all pleas to make prenatal care available to all people as a means of preventing anomalies has no basis for fact. This care would materially help the mothers, but it would do little to change congenital anomaly statistics.

MANAGEMENT

The word management is used advisedly rather than treatment, because the care of the congenitally deformed child requires multi-faceted disciplines. One must remember that this is a child with a handicap, and not a handicapped child. Keep the "child" out in front, and think of the whole child first, the handicap second.

Evaluate what this handicap is going to require of the child in its relation to the parents, the physician, members of the immediate family, and the community at large.

Initially, the parents must be dealt with. The father should probably be told first, and shortly thereafter the mother. Hold nothing back, as they need to know all the facts in order to face this ordeal realistically. Franklin made the comment that we must accept the child without "any sense of personal responsibility for the tragedy, without remorse, without recrimination, but certainly not without sorrowing and suffering until the wound is healed."[2] Perhaps directing the question "why did this happen to the baby?" to the parents, and not "why did this happen to us?" — will help bring the problem into its proper focus.

Be as realistic as possible in your opinion as far as ultimate results are concerned. Also try to outline a sequence of procedure, be it medical or surgical, as necessary for correction of the defect. Realize at the same time that the parents may not accept the truth and only by perseverance and patience will you be able to give them assistance.

Continually try to relate the child to his environment and community. A child with a perfectly repaired syndactyly has no use for this operation if he is so severely ataxic he can't hold his hands still. The problem of a sheltered hospital or home environment will arise again and again. Only by frequent counseling with regard to all factors can you help the **parents** make this decision.

CONCLUSION

A brief review of the causative mechanisms of congenital anomalies is presented. By understanding their etiology and nature, a rational method of approach to the prevention and care of congenital anomalies can be practiced.

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CLINICOPATHOLOGICAL CONFERENCE - SIOUX VALLEY HOSPITAL

From the Intern and Resident Teaching Conferences of the Sioux Valley Hospital, Sioux Falls

JOHN F. BARLOW, M.D.*
Pathologist - Editor

WALLACE A. ARNESON, M.D., F.A.C.S.**
Surgeon - Discusser

A 64-year old Caucasian male entered the hospital because of lower abdominal discomfort and "loose bowels" of several weeks duration.

Present illness — The patient had had 7-8 loose bowel movements each day without gross blood or black stools. There was no mucous in the stool. There was lower abdominal discomfort chiefly on the left but there were no cramps. There was a ten-pound weight loss over the previous several weeks.

Past history — The patient had had an appendectomy several years ago without complications. The past history was otherwise negative.

Physical examination revealed a temperature of 99°F, pulse 80 per minute (regular), and blood pressure 130/80. He was a well-developed, well-nourished white male. The head and neck were unremarkable. The heart and lungs were normal. The liver and spleen were not palpable. There was some tenderness low on the left side but no spasm. The tenderness was only on deep palpation. There were no herniae. Rectal examination was negative.

Laboratory data — Urinalysis: Straw-colored, clear, specific gravity 1.012, pH 5.5; protein, glucose, hemoglobin were all negative. Sediment showed occasional epithelial cells, 0-2 WBC/HPF. Hemoglobin was 12.9 gms. %,[3] hematocrit 40%, MCH 30 micromicrograms, MCV 95 cubic micra, MCHC 95%. WBC was 8,000/mm.[3] with 51% polys, 2% bands, 6% eosinophils, 1% basophils, 31% lymphocytes, and 9% monocytes. VDRL was non-reactive. Red Cell Count was 4.29 million/mm.[3]

Sigmoidoscopic exam showed a lesion at 18 cm. The lesion could not be well-visualized because of marked narrowing in the region. No definite ulcer or lesion was seen. A biopsy showed adenomatous polyps and chronic inflammation with no evidence of malignancy. X-ray revealed a constricting lesion of the distal sigmoid. Two days after admission, an operation was performed.

CLINICAL DISCUSSION

Dr. Wallace A. Arneson: This is a 64-year old man who had two definite symptoms: First, he had pain, and second he had change in his bowel habits. There was no gross blood in the stool or black stools, and there was no mucous in the stool. The absence of the latter symptoms is not unusual in an obstructing lesion. The two symptoms that we do have, plus the weight loss, are certainly very significant. The change in bowel habits happened to be increase in stools rather than the opposite. The past history is irrelevant and the physical examination shows the man to be in good general shape. It is interesting to note that there were no herniae because there has been much written recently about the association of herniae with left-sided colon lesions.

Laboratory data was also essentially negative. Hemoglobin was slightly depressed but that could be consistent with many conditions. The next significant points are the sigmoidoscopic examination and the x-ray examination. The sigmoidoscopic examination showed a lesion at 18 cm. which could not be well-visualized because of marked narrowing in the region. No definite ulcer was seen. A biopsy showed adenomatous polyps and chronic inflammation with no evidence of malignancy. The x-ray revealed a constricting lesion in the distal sigmoid. The sigmoidoscopic examination, although showing no ulcer or lesion, did show something useful. The important thing is that there was a narrowing that the surgeon couldn't see well but he did get a diagnosis of adenomatous polyps. This is one of the cases where the x-ray would be needed because at 18 cm. one can have a physiologic narrowing or a twist

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in the bowel that makes it almost impossible to get the scope past this point. When a biopsy is taken and you get such a pathologic report, if you can see a good lesion, usually you overlook the report. All it means is that you didn't get down deep enough on the lesion to get a definite diagnosis of adenocarcinoma. You have to base further treatment on your clinical findings. I am approaching this case as if it were a carcinoma. But it really doesn't make much difference — the truth is you can't avoid going ahead and treating the lesion as if it were carcinoma. This was done.

Dr. James A. Rud*: The surgeon felt that he took the biopsy directly from the lesion and was disappointed when the Pathology Department was unable to give him a diagnosis of malignancy. He couldn't see a definite mucosal alteration, but stated there was a distinct narrowing at the point where he had taken the biopsy.

Dr. Arneson: This is a common predicament. I have had a number of cases in the past few years with a biopsy diagnosis of adenomatous polyps only. The explanation is that with a fungating lesion, sometimes only the top portions of the tumor are sampled and hence a definite diagnosis of malignancy cannot be made. If the surgeon sees a definite lesion and receives a benign diagnosis on the biopsy report, it probably means that he just did not get deep enough for an adequate specimen. Often only the base of the lesion will show histology diagnostic of carcinoma.

Much has been written in the last few years about the relationship of polyps and malignancy. I feel that polyps themselves are not premalignant but that if the patient has a polypoid lesion, it may be a carcinoma with good differentiation on its top. I think it's been pretty well proven now that the small, smooth-surfaced adenomatous polyp doesn't have a great deal more tendency to form cancer than any other part of the bowel mucosa. In counter-distinction, however, the villous adenoma does have a serious malignant potential. Dr. McHardy, will you discuss the x-rays?

Dr. Bryson McHardy†: By x-ray this is a constricting lesion of the sigmoid, for all intents and purposes a carcinoma. There are, however, a few small diverticula in the descending colon (Fig. 1).

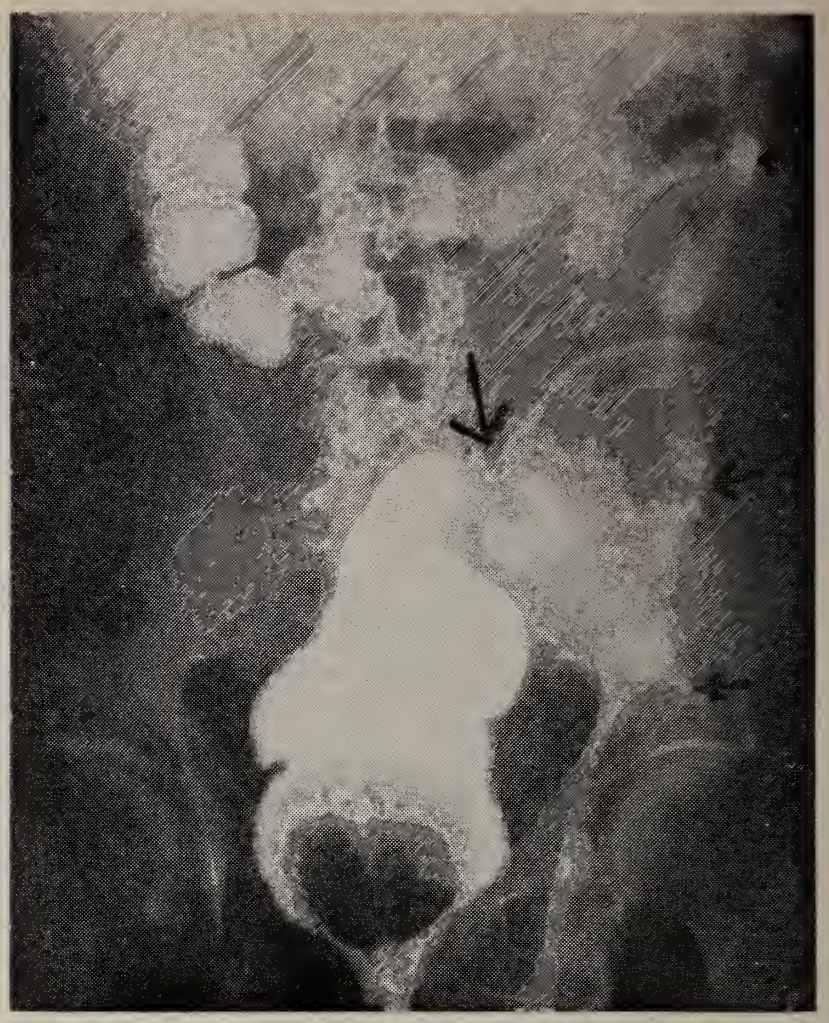


Fig. 1 Barium enema of colon shows area of constriction (large arrow) in sigmoid colon and several diverticula in descending colon (small arrows).

Dr. Arneson: A few other points deserve further comment. First, this patient had pain and change of bowel habits. One always thinks of bleeding as the most prominent symptom of colonic lesions. Statistically, however, with a carcinoma in this area bleeding comes in third or fourth in the symptoms and signs: Pain and change in bowel habits occurs in about 80-90% and bleeding in only about 40% of cases. Secondly, what about the association of herniae with lesions of the bowel? I'm talking about a direct not an indirect hernia. You're born with an indirect hernia! There are statistics to show that if the patient has an obstructive lower colonic lesion, repetitive "straining" and "pushing" may cause a hernia. I don't see the sense of occupying the literature with such nonsense. A direct hernia can be brought on by strain, but how long is a patient going to live with a truly obstructing lesion of the colon? I rather doubt that many will live long enough to develop a hernia.

The differential diagnosis in my opinion amounts to a play on words. Whatever the lesion, I would be very far out on a thin limb if I did not make a presumptive diagnosis of adenocarcinoma and recommend exploration with probable sigmoid resection. The other major possibility is that of diverticulosis and

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diverticulitis. I'm sure that all of us have seen a fairly good number of cases with a clear cut clinical picture of carcinoma which, happily for the patient, turn out to be diverticulitis at surgery. Diverticulosis is a very common disease present in about 10% of all people over 40.

Other entities that might cause a constricting lesion of the colon are unlikely possibilities. There is no history of venereal disease and no mention of a Frei test, so the benign stricture that may occur in lymphogranuloma venereum is unlikely. Constricting lesions secondary to ischemia have been reported. These may occur after sacrifice of the inferior mesenteric artery in aortic surgery, but may also occur due to severe arterial disease alone. There is nothing to make us consider ischemic disease here. Endometriosis in women may give a picture exactly simulating sigmoid carcinoma but this, of course, does not concern us here. We have no reason to consider trauma or an infection such as amebiasis.

Although I have no personal experience in the cytologic diagnosis of colonic carcinomas, the examination of stool washings for malignant cells would impress me as superfluous in a case such as this with sigmoidoscopic and radiologic evidence of a constricting lesion.

With a presumptive diagnosis of adenocarcinoma I would proceed as follows: I would assume that at 18 cm. the lesion would be amenable to resection, followed by end-to-end anastomosis. If not, however, I would be prepared for a change of plans allowing for a combined abdomino-perineal resection. I'm not a stickler for the old rule of thumb in which the latter is performed for lesions below 6 cm. and end-to-end anastomosis for lesions above 6 cm. If any doubt regarding total removal of the tumor by resection exists, the surgeon should feel strongly committed to a combined abdomino-perineal resection.

If 50 surgeons were to prepare this patient for surgery they would have 50 different ways of doing it. Probably all would accomplish the job. I use Neomycin routinely and have had no difficulty with staphylococcal enterocolitis. Perhaps this only means that I've been lucky. My next ten cases may all have it. Sulfathiazole is effective if time permits. However, for rapid preparation, I prefer Neomycin. I commence the morning before surgery giving the patient castor oil and Neomycin every two hours starting about 8 or 10 a.m. Some surgeons begin it in the afternoon, continue through the night, with two more doses the morning of surgery.

After opening the abdomen and exposing the colon the surgeon is still occasionally confronted with uncertainty as to whether the primary lesion is a carcinoma or diverticulitis. All surgeons and pathologists have experienced cases in which they could not distinguish between them on gross examination. Of course, the surgeon in this situation is reluctant to manipulate the colon in the region of the lesion unnecessarily fearing that malignant cells may be extruded, a prime cause of recurrence of malignancy at anastomotic sites. I think it important to occlude the bowel above and below before handling the mesentery. It has been proved that you can find malignant cells above and below the lesion in proportion to the manipulation given to it. Many surgeons also feel that manipulation of the lesion in situ is an important factor in lymphatic and vascular metastasis and attempt to tie off the blood supply first. This can be difficult particularly in an obese patient. The important thing is to handle the lesion gently.

If the surgeon can get below the lesion well enough and if the lesion is not one of those just above the peritoneal reflection or fixed in the posterior abdominal wall, a primary resection and anastomosis will do. By the way, I don't mean fixed solidly, but just kind of tucked away. This is the type of case I mentioned where I hope the surgeon would do a combined abdomino-perineal resection. I'm not worried about the colostomy. I have patients who wouldn't go back to having a rectum.

I would like to diverge for a moment and discuss the problem of decompression. If there is mild obstruction the surgeon can often do a primary resection and anastomosis. Otherwise, he may have to do a cecostomy or possibly a colostomy. I am seeing fewer patients with severe obstruction lately and have not had the problem as much as I used to.

Dr. Robert Nelson*: I am seeing more patients with more severe obstruction lately. I usually perform a descending colostomy for a rectosigmoid lesion and close the colostomy at a second procedure. I am afraid of resection and primary anastomosis in patients with obstruction. One should also consider a Rankin resection which is a cancer operation and a double-barrelled colostomy with secondary closure of the latter.

* Staff surgeon — Sioux Valley Hospital.

Dr. Arneson: I am a strong advocate of cecostomy in patients with obstruction. This cuts down on the number of operations.

Dr. John McGreevy*: What type of cecostomy do you do?

Dr. Arneson: I implant a mushroom catheter in the bowel.

Dr. Dorence Ensberg*: The beauty of a cecostomy in a very sick patient with severe obstruction is that you can decompress the patient quickly without a lot of unnecessary trauma.

DR. WALLACE ARNESON'S DIAGNOSIS

1. Carcinoma of the colon
2. Diverticulosis and diverticulitis

PATHOLOGIC DISCUSSION

Dr. John Barlow: The abdomen was opened and an anterior resection was performed. The lesion grossly simulated a carcinoma. On opening the bowel through the markedly constricted area seen externally, the mucosa was intact but the bowel wall was markedly thickened. Several diverticula were found adjacent to the area of narrowing as described on x-ray. In the thickened area of bowel were soft areas which were filled by purulent material. On microscopic examination diverticular walls were seen in the area of thickening as well as abscesses adjacent to the diverticula. There was extensive fibrosis of the wall secondary to the inflammation. We felt the case was one of diverticulosis and diverticulitis. (See Fig. 2 and 3)

Dr. Delwin Ohrt†: Dr. Barlow, will you discuss the controversial malignant potential of polyps of the colon?

Dr. Barlow: I believe the difficulty arises because there are a number of different neoplastic lesions of the colon. First, villous adenomas are

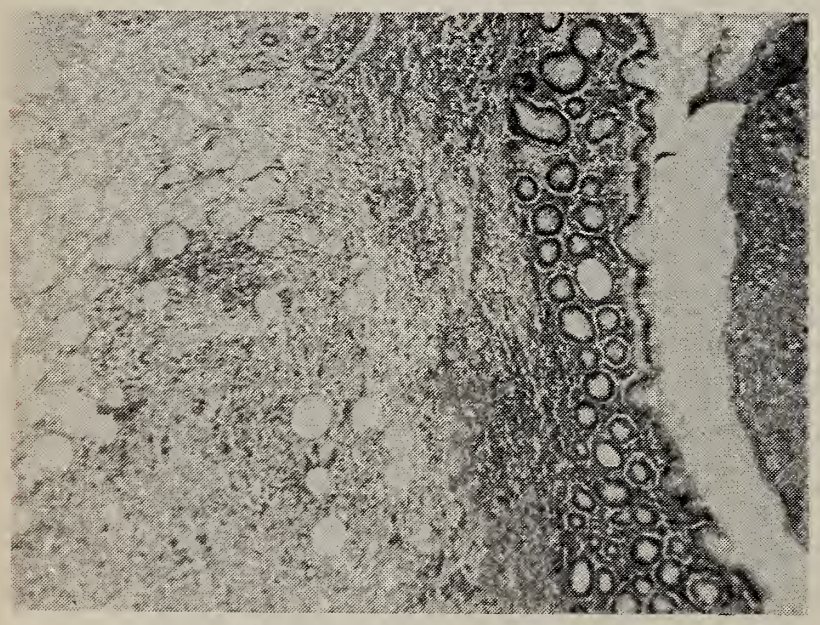


Fig. II Wall of diverticulum with surrounding inflammation and fibrosis.

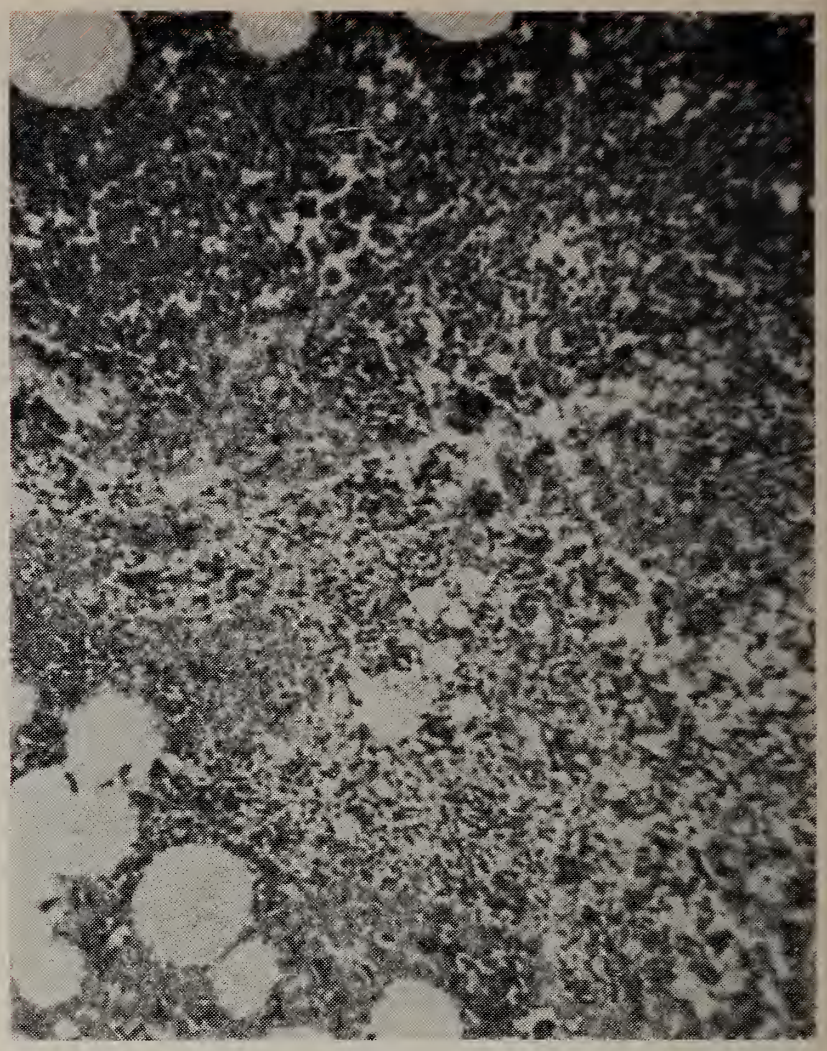


Fig. III Abscess in pericolic region near area of narrowing. This is presumably secondary to a ruptured diverticulum.

large sessile lesions with a definite malignant potential. They are composed of tall villi in a microscopic "picket-fence" arrangement. The second type of lesion has been alluded to by Dr. Arneson. This is a polypoid carcinoma. This is a carcinoma often well-differentiated with superficial invasion but which grossly looks like a polyp. The whole lesion is carcinoma and it is to be differentiated from the third type, a benign proliferation of glands in a polypoid fashion. The latter describes the adenomatous polyp. Whether these adenomatous polyps may degenerate into a malignancy is a controversial point. Personally, I and many other pathologists believe they are most likely not premalignant. A very practical point, however, is what to do for atypicality or so-called carcinoma in situ in a stalked adenomatous polyp. There have been several large studies and the concensus appears to be that local resection for these is adequate. They do not metastasize. The fourth lesion is the hyperplastic mucosal polyp which is a flat lesion. This lesion has been discussed by Dr. Arneson. It is benign and most likely not premalignant. Other rare lesions like lymphoid polyp and juvenile polyps are also benign lesions.

FINAL ANATOMIC DIAGNOSIS

DIVERTICULITIS, SIGMOID COLON

(See Page 58 for Bibliography)

* Staff surgeons — Sioux Valley Hospital.
† Formerly Intern, presently Pathology Resident — Sioux Valley Hospital.

DEADWOOD DOCTOR

By F. S. Howe, M.D.

CHAPTER V

Romance vs. Lawsuits

Early one evening, during my first months in Deadwood, I was called to see a man who was complaining of an extremely severe pain in his right hip and leg. It was a very acute and very severe sciatica, known then as sciatic rheumatism. The first time I saw the man, he gave me the following history. He said that a few days before he was walking up Sherman Street and when he passed by the Fish and Hunter Lumber Yard there was a plank extending out over the sidewalk. He stated that he tripped on this plank and got a very nasty fall and that this pain came on soon afterwards. At that time I believed that my patients came first and that their statements were always true and honest.

I treated this man for many months with everything that we knew at that time. He made a very slow recovery but finally did improve so that he could walk around. This man brought suit against the Fish and Hunter Company for $5,000.00 in payment for his suffering and injury. He had a witness who swore that he saw him fall. Before the case came to trial, Fish and Hunter Company lawyers secured three well known physicians and through a court order made an examination of the plaintiff. These men all gave testimony in court that they believed that the man was malingering. I had the only medical testimony for the plaintiff. My testimony apparently made a good impression on the jury — they probably felt sorry for me, I don't know — but they gave a $5,000.00 verdict against the Fish and Hunter Company.

It so happened that at the time and for some time previously I had been making regular visits to the Hunter residence. Soon after the trial came the evening that I usually devoted to visiting the Hunter residence to see their pretty daughter, Lillian. It was with fear and trembling that I got up nerve enough to even show up. I fully expected the door to be closed in my face. I had done what I thought was my duty to my patient. I was agreeably surprised to find a friendly greeting and, of course, lawsuits were not mentioned. Long afterwards I learned that John Hunter said that I was only doing what I thought was my duty and that it should make no difference with them; mother and daughter had both wanted to slam the door in my face. Fortunately for me his judgment prevailed. The aftermath of this case was amusing.

Charles Krause, who was then with the Fish and Hunter Company, got $3,500.00 in currency and made a trip to the mining camp of Galena with which to pay off my former patient in cash. I was immediately informed of the transaction and hired a team and buggy the next day to collect my money. The money was not there, and I told the gentleman that he would either pay or one of us would get licked, I didn't know which one, but found him to be very yellow. He, of course, hired his lawyers on a contingent fee and they never got a dime. He also failed to pay me but I took a judgment against him. A year or two later he was trying to sell a homestead and failed to give proper title until he satisfied the judgment, which he did. The real facts in this case as I found out later were that he never did fall and that he hired his star witness who testified that he saw him fall and helped pick him up. In other words, he and his star witness were first class crooks. I never again fell for the idea of a traumatic sciatica.

On August 29, 1904 I married Lillian Hunter, the only daughter of John Hunter. We have five children, all of them living. Dr. John Howe is a Pathologist in Washington, D. C. Elizabeth Howe Donaldson is living in Pierre. Genevieve Howe Spurdon is living in Irvington, New York. Another daughter, Laura, is married to Harold R. Newell and they live in Deadwood. The youngest, Margaret, is married to Alan B. Clark and also lives in Deadwood.

One experience which I shall never forget came the second day after we had returned from our honeymoon. We went to Chicago, stopping at the Palmer House, returning shortly before the middle of September. After we had been home about a day, the Sheriff of the County, Harry Trathen, whom I knew very well rode up to our home on horseback and said, "I have a piece of paper for you." After he had gone, I read the piece of paper. It was a malpractice suit for $10,000, which a woman patient was bringing against me. There had never been a complaint of any kind relative to the treatment of her Colles fracture, which is a fracture of both bones of the forearm just above the wrist. I had taken special precautions because of the reputation of the people. I discharged her before we went on our wedding trip and assumed she was doing fine.

I don't know why I didn't faint, but I guess I wasn't the fainting kind. However, a $10,000 suit at that time looked like ten million would

now to me. The case came to trial and the patient swore that a certain doctor had told her that it was a very poor job. The late Judge Rice was presiding. I was defended by R. P. Stewart and Colonel W. H. Parker. My attorneys asked for dismissal of the case. Judge Rice said, "Except for one thing I would dismiss this case right now. There is in the evidence a statement that was supposed to be made by a physician that this was not properly taken care of. I am going to ask the defense to present their testimony." I had every doctor in Deadwood and Lead testify for me. The doctor who was supposed to have criticized the work stated on the witness stand that he had never made such a statement and that he had no criticism whatsoever.

Dr. J. W. Freeman, who was then known as the best bone surgeon in the State of South Dakota, made a detailed statement in which he said that he examined the woman and that she claimed to have no motion whatever in her wrist. He called her attention to something else and moved the hand and wrist in every direction. He stated that the result was excellent and that she had good motion in the joint. After the lawyers had completed their pleas, Judge Rice flayed the plaintiff's attorney in a manner which I have never heard before or since. He told him in open court that if he ever brought a case of this kind into his court again that he would have him disbarred from practice. He instructed the jury to bring the verdict in my favor without leaving their seats. I have fortunately never had to fight another malpractice suit. At that time I carried no medical insurance and it was really a matter of great concern to me. Later I had the pleasure of attaching the salary of the former patient and collecting for my services.

When I had been in Deadwood only a short time, I had been called to a shack up on the mountainside to see a 12 year old boy who had been ill for a week. I examined him and made an immediate diagnosis of diphtheria and told the father that the boy must have anti-toxin immediately. I was told that he had no money and that he was unable to buy it. I made a trip to the drug store, bought the anti-toxin, and guaranteed payment. Within 30 minutes from the time I first saw the patient, I administered a large dose of anti-toxin. The boy died within a couple of days from respiratory failure. After his death the father went to every doctor in this part of the Black Hills to try to find someone who would agree with him that the anti-toxin killed the boy. He was preparing to start a malpractice suit; he was, of course, unable to find a doctor who would be foolish enough to make such a statement. I was out my time and the cost of the anti-toxin, which was very expensive in those days.

(To be Continued)

LETTERS TO THE EDITOR

Mr. Richard Erickson
S. D. State Medical Association
711 N. Lake Ave.
Sioux Falls, S. Dak.
Dear Mr. Erickson,

I would like to thank the S. D. State Medical Association for their more than generous scholarship. It is a most helpful thing to receive financial assistance at this or any point in one's education, and my being named as the recipient of your award was a very welcome and encouraging event.

I hope that you will relate my thanks to the members of the state medical association, and that I can demonstrate that their organization's confidence in me was soundly based.

Sincerely yours,
Robert M. Hamm
Vermillion, S. D.

(Continued from Page 56)

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Path C A P sule

Submitted by the College of American Pathology in connection with the South Dakota Society of Pathologists.

THE LABORATORY DIAGNOSIS OF INFECTIOUS MONONUCLEOSIS

Infectious mononucleosis is an acute infectious disease, probably of viral origin, seen most frequently in young adults.

The disease onset is characterized by an irregular fever and sore throat. More often than not, the cervical lymph nodes are enlarged and frequently tender although other nodes may be involved. The spleen is enlarged in roughly fifty per cent of patients. The rash, when present, is blotchy and limited to the trunk and may be difficult to distinguish from a drug rash. Less than five per cent of infectious mononucleosis cases may be jaundiced.

Although leucopenia is frequently noted early in the first week of illness, by the second week a moderate leucocytosis (10,000-20,000 cells) consisting largely of lymphocytic cells is present. Many of these lymphocytes are pleomorphic and show a marked variation in size. Nucleus and cytoplasm stain irregularly and contain both vacuoles and granules. These cells are the "atypical lymphocytes" seen in most cases toward the end of the second week. Similar findings are often present in acute viral infections and, therefore, are not singularly diagnostic for infectious mononucleosis.

Late in the first week of disease a rise in sheep cell agglutinins can be detected in the serum of the patient by the Heterophile (Paul-Bunnell) Test.[1] Antibody, supposedly formed in response to the infectious mononucleosis virus fortuitously, since we have no viral antigen, will agglutinate sheep erythrocytes. This is a nonspecific (heterophile) reaction and is the basis for the serological diagnosis of infectious mononucleosis. Although normal serum may contain sheep cell agglutinins, these titers are low, usually less than 1:56.

Heterophile titers due to infectious mononucleosis increase rapidly during the second week of illness and are usually 1:56 or greater. A titer of 1:224, or a rising titer, in the presence of suggestive clinical and hematological evidence will firmly support the diagnosis of infectious mononucleosis.

For several reasons the serological diagnosis of infectious mononucleosis cannot be made solely on the basis of an elevated heterophile titer. Serum sickness frequently causes an increase in sheep cell agglutinins and occasionally normal serum will be found to contain abnormally high levels. Furthermore, in early cases of infectious mononucleosis or (rarely) throughout the course of the disease, low titers may be found.

Following the demonstration of sheep cell agglutinins, the type of antibody present is identified by absorption of the serum with various antigens (Differential Absorption Test[2]). Forssman-type antigens are suspensions of guinea pig or horse kidneys and are known to absorb all or most sheep cell agglutinins that are present in the serum following serum sickness. These same antigens will also absorb most of the agglutinins present in normal serum. They will not, however, absorb any appreciable amount of the sheep cell agglutinins from the serum of patients having infectious mononucleosis. Ox or beef red cell antigens will absorb infectious mononucleosis antibody to the extent that positive serum, when tested after beef red cell absorption, retains little, if any, agglutinins for sheep red cells.

Agglutinin titers present due to serum sickness and normal agglutinins are not appreciably reduced by beef cell absorption.

Referring to the table below the absorption pattern of infectious mononucleosis antibodies can be easily visualized. It is this combination of little or no absorption by Forssman antigen and complete or nearly complete absorption by beef cell antigen that is diagnostic with marked accuracy.

Serum sickness agglutinins are largely or completely absorbed by Forssman antigen and relatively unaffected by beef cell absorption.

Infectious mononucleosis is a benign, self-limiting illness in the great majority of cases. An accurate diagnosis is frequently important to rule out more serious diseases. This is particularly true when, due to lymph node involvement and hematological findings, leukemia must be included in the differential diagnosis. Also, in the more severe forms, septicemia and disseminating bacterial infections must be ruled out. Both serological and hematological studies are occasionally necessary to confirm the diagnosis. When low heterophile titers are reported in suspected cases the serology should be repeated within two-three weeks. Absorption patterns when typical of infectious mononucleosis,

are of greater diagnostic significance than high agglutinin titers alone and when compatible with clinical and hematological evidence are accurate to a marked degree.

ABSORPTION OF SHEEP CELL AGGLUTININS IN HUMAN SERUM

Type of Disease	Antigens	
	Horse or Guinea Pig Kidney (Forssman)	Beef Cell
Normal or other infections	Largely or completely absorbed	Variable
Infectious mononucleosis	Poorly absorbed	Largely or completely absorbed
Serum sickness	Absorbed, usually completely	Poorly absorbed

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ANTIBODY TESTING IN PREGNANCY

The antigenic structure of the red cell is under genetic control and the inheritance of red cell antigens has been the subject of intensive study for the past 25 years. It is now known that there are many different kinds of red blood cell antigens. Until recently the only antigens deemed of any important consideration in blood transfusion were those in the ABO and Rh systems. It is now clear, however, that blood group antigens which were either ignored or unknown at the time of the compatibility testing, have resulted in the sensitization of a large number of persons who received transfusions. It is important to remember that patients who are transfused with blood containing a red cell antigen which they themselves lack are capable of forming antibodies to these foreign antigens. It is now recognized that a patient's blood is as individual as his fingerprints. The only identical and completely compatible blood for transfusion is the patient's own blood or blood from an identical twin; hence, practically all transfusions are subject to a calculated risk.

In addition to sensitization arising from transfusion of blood or blood products, cases of sensitization can arise during pregnancy when the red blood cells of a fetus containing a factor or factors which the mother lacks gain access to the maternal circulation and stimulate the mother to form antibodies against these foreign antigens. These antibodies are the cause of hemolytic disease of the newborn.

A surprisingly high incidence of unexpected red cell sensitization is being discovered as a result of modern crossmatching procedures. It is becoming the accepted practice in pretransfusion compatibility testing to screen **both** the recipient and the donor for the presence of antibodies. This is done using group O cells containing all of the commonly known red cell antigens. When an antibody is detected its identity and concentration (titer) should be established using a panel of group O cells with known antigenic characteristics.

Heretofore, ante-natal red cell testing of patients has been concerned primarily with the Rh system, and Rh negative patients have received the greatest attention. It is clear, however, that Rh positive patients are also capable of forming antibodies which can cause hemolytic disease of the newborn. These antibodies may be directed at other Rh factors which the mother lacks or they may be directed at antigens in systems other than the Rh system.

Maternal antibodies to the following as well as other blood factors have been reported as the cause of hemolytic disease of the newborn:

SYSTEM	FACTORS
ABO	A1, B
Rh	D, C, c, E, e, and many Rh variants
MNSs	M, S, s
Kell	K, k
Duffy	Fy^A, Fy^B
Lewis	Le^A, Le^B
Lutheran	Lu^B
Kidd	Jk^A, Jk^B

Although the overwhelming number of cases of hemolytic disease are related to ABO and Rh sensitization, other antibodies, when present, are a potential danger to the pregnant woman. Most authorities agree that three examinations for the detection of antibodies are necessary: (1) During the first trimester of pregnancy; (2) at the 28th week; and (3) at the 36th week of gestation. If an antibody develops it should be identified and titered. Through the 28th week the titer of this antibody should be determined once per month and after the 28th week once every two weeks. The height of the titer and the rate of rise of the titer can be correlated roughly with the severity of the disease and may indicate the necessity of the interruption of the pregnancy for the benefit of the infant.

Furthermore in any case of sensitization of the mother it is extremely important to be alerted prior to delivery that an affected infant need transfusion, and also permits selection of compatible blood for possible exchange transfu-

(Continued on Page 62)

SOUTH DAKOTA STATE MEDICAL ASSOCIATION COUNCIL MEETING MINUTES

September 9, 1966

Sheraton Johnson Hotel Rapid City, South Dakota

The meeting was called to order by E. T. Lietzke, M.D., Chairman of the Council at 7:30 P.M. The following physicians were present for roll call: John J. Stransky, M.D.; John T. Elston, M.D.; A. P. Reding, M.D.; Paul Hohm, M.D.; E. J. Perry, M.D.; J. A. Muggly, M.D.; A. J. Tieszen, M.D.; Harvard Lewis, M.D.; E. T. Lietzke, M.D.; Clark F. Johnson, M.D.; C. E. Tesar, M.D.; E. P. Sweet, M.D.; H. E. Lowe, M.D.; E. A. Johnson, M.D. Also present were Commission Chairmen J. B. Gregg, M.D.; R. H. Quinn, M.D.; M. R. Cosand, M.D.; and Mr. Dallas Whaley of the American Medical Association.

Dr. Lietzke introduced Dr. J. A. Muggly as the new Councilor from the Third District Medical Society and Dr. Elston introduced Dr. C. E. Tesar as the new Councilor from the Black Hills District Medical Society.

Dr. Perry moved that the reading of the minutes of the last meeting be dispensed with inasmuch as they have been published. The motion was seconded by Dr. Elston and carried.

A discussion was held on the Resolution passed by the Council on April 2, regarding separate billing. Dr. Hohm moved that before the resolution is implemented by the Council, it be referred for further study to the Commission on Legislation and Governmental Relations and that a report be made at the January Council meeting. The motion was seconded by Dr. Lewis and carried.

Mr. Erickson discussed the orientation program for new physicians in South Dakota. Dr. Perry moved that the orientation program be discontinued on a State level and that the individual districts handle this function. The motion was seconded by Dr. Reding and carried.

The Report of the Commission on Medical Service was considered.

Report of the Commission on Medical Service

1. In regard to the resolution regarding increasing the number of nurses for the State of South Dakota, a meeting was to have been held one month ago in Mitchell, but had to be cancelled because of the airlines strike. A meeting is to be held in Mitchell the day of the Council meeting and the Chairman of the Commission on Medical Service will attend the meeting on the way to Rapid City. If any pertinent information is forthcoming from the meeting, it will be reported to the Council.
2. The subject of the development of a four year medical school in South Dakota is still under investigation and no formal report can be made at this time.
3. The Chairman of the Commission on Medical Service, with other members of the Commission, has investigated the subject of the appointment of a Dean for the School of Medicine at the University of South Dakota. A report will undoubtedly be forthcoming either from the Chairman of the Commission on Legislation or the Commission on Medical Service.
4. Traffic Safety — no report.
5. Rural Health — the report recently received from the AMA headquarters is submitted for the studied consideration of the members of the Council.

Respectfully submitted,
J. B. Gregg, M.D., Chairman
Commission on Medical Service

Dr. Gregg also gave a short oral report to the Council concerning the proposed meeting with the new Dean of the Medical School and the progress of the Commission's work to encourage girls to enter nursing training in South Dakota. Dr. Elston moved the adoption of the Report of the Commission on Medical Service. The motion was seconded by Dr. Perry and carried.

Dr. R. H. Quinn gave a short oral report on the work of the Commission on Legislation and Governmental Relations. He requested the assistance and help of all physicians in determining legislation to be acted on at the coming legislative session. Dr. Reding moved that the report be adopted. The motion was seconded by Dr. Perry and carried.

No report was submitted by the Commission on Internal Affairs.

No report was submitted by the Commission on Communications. However, Mr. Erickson discussed the work being done to publicize Community Health Week later on this fall.

No report was submitted by the Commission on Scientific Medicine. This Commission will meet on October 1.

Dr. Cosand gave an oral report for the Commission on Liaison with Allied Organizations. He suggested that the Pharmaceutical Association be contacted to determine what legislation they are planning to introduce at the State level in 1967. A discussion was held on a proposed public relations program regarding labeling of prescriptions as to the name of the drug and strength, as suggested by the American Medical Association. Dr. Stransky moved that this program be referred to the Commission on Liaison with Allied Organizations for study and recommendation. The motion was seconded by Dr. Perry and carried. Dr. Perry moved the adoption of the report. The motion was seconded by Dr. Elston and carried.

Dr. Clark Johnson moved that the names of Dr. George Rinker, the professor of anatomy at the University of South Dakota Medical School, and Dr. Read, the professor of physiology, be submitted to the Governor as possible appointees to the Basic Science Board to replace Dr. Walter Hard. The motion was seconded by Dr. Elston and carried.

Mr. Erickson discussed the termination of the OAA program in the State. Dr. Perry moved that the equipment which has been purchased for this program be retained by Blue Shield and that any funds left for administrative purposes be transferred to the Building Fund to be used to pay outstanding notes. The motion was seconded by Dr. Clark Johnson and carried.

Mr. Erickson discussed the bonus policy of the Association. Dr. Hohm moved that the bonus given to executive personnel be raised to $15.00 for each year of service, if funds are available. The motion was seconded by Dr. Stransky and carried.

Mr. Erickson discussed developments on Title 19 on the State level. Mr. Whaley also commented on Title 19 on the national level. Dr. Elston moved that the Council recommend that the South Dakota Blue Shield Board make every effort to obtain, if possible, the contract to operate Title 19, as implemented in South Dakota. The motion was seconded by Dr. Perry and carried.

Dr. Hohm discussed a request from Dr. Howard Saylor, a member of the Welfare Commission for a State Medical Association committee to act in an advisory capacity to the Commission on Title 19. Dr. Hohm moved that the Chairman of the Council appoint a three or four man committee from the South Dakota State Medical Association to act as consultants to the Welfare Commission on Title 19. The motion was seconded by Dr. Elston and carried. Dr. Lietzke, as Chairman of the Council appointed Dr. Paul Hohm, Dr. R. H. Quinn, Dr. R. Hayes and Dr. John Stransky to serve on this Advisory Committee.

A discussion was held on the fee schedule used by the State Health Department for the Crippled Children's Program. Dr. Hohm moved that the Council inform the Department of Health that with the utilization of Federal aid programs that match State funds, the Council now recommends that doctors make their usual and customary charges for these patients in the Crippled Children's Program. The motion was seconded by Dr. Elston and carried.

Dr. Stransky discussed the Traffic Safety Advisory and Support Group which was established by Governor Joe Foss. Dr. Stransky moved that Dr. R. C. Jahraus be appointed to this committee to replace himself when he resigns. The motion was seconded by Dr. Reding and carried.

Mr. Erickson discussed the operation of the Medicare program and utilization of the existing building facilities. Dr. Hohm moved that the executive secre-

tary check into the possibility of obtaining a trailer or other portable building; if the situation reaches a point where he would recommend adding to the building, that a vote be taken by mail. The motion was seconded by Dr. Clark Johnson and carried.

Dr. Lewis submitted the name of Dr. D. R. Mabee as an honorary life member of the Association. Dr. Reding moved that Dr. Mabee be named an Honorary member of the Association. The motion was seconded by Dr. Perry and carried.

The Council considered the report of the South Dakota Health Research Institute Computer Project. Dr. Hohm moved that the report be accepted. The motion was seconded by Dr. Cosand. Dr. Stransky moved to amend the motion that the three physicians appointed to the Board of Directors of this corporation to represent the State Medical Association be instructed not to proceed further with seeking Federal funds until the Council has received a report in person at the next Council meeting. Dr. Perry seconded the amendment to the motion and it was carried. The original motion, as amended, was then voted on and carried.

Mr. Erickson discussed the North Central Conference to be held in St. Paul in November, and urged the Councilors to attend, if possible.

Dr. Hohm reported on the progress made by the Heart, Cancer, and Stroke Advisory Committee. Dr. Cosand moved that Dr. Hohm continue as the representative of the Medical Association to the Advisory Committee on Heart, Cancer, and Stroke. The motion was seconded by Dr. Perry and carried.

A discussion was held on the date of the next Council meeting. Dr. Stransky moved that Mr. Erickson be empowered to set the time and place of the January Council meeting, after consultation with Dr. Muggly who is planning the College of Surgeons meeting. The motion was seconded by Dr. Reding and carried.

A discussion was held on the replacement to the Selective Service Advisory Committee for Dr. Paul V. McCarthy who has resigned. Dr. Perry moved that Drs. B. F. King, G. J. Bloemendaal, and Paul Bunker be contacted to determine if one of them would consent to serve on the Advisory Committee. The motion was seconded by Dr. Stransky and carried.

Mr. Erickson announced the events to be held in conjunction with the Medical Legal Conference on September 10.

The meeting adjourned at 11:15 P.M.

PathCAPsule

(Continued from Page 60)

sion of the infant. In the latter instance the pretransfusion compatibility testing is performed utilizing the mother's serum. In cases in which an erythroblastotic infant is transferred to another hospital for treatment a sample of the mother's blood should accompany the infant.

SUMMARY

The presence of irregular antibodies in the blood of pregnant women, particularly those who are "Rh negative" or who have had previous pregnancies or transfusions, is not unusual. These antibodies are not limited to the blood of "Rh negative" women, and many "Rh positive" women have such antibodies. All of these antibodies of which the more common ones are listed above are capable of causing erythroblastosis. In many areas the only routine, prenatal immunohematologic tests that are done consist of ABO grouping and Rho (D) typing; thus many potentially dangerous antibodies are never recis to be expected. This permits proper selection of compatible blood for the mother, should she ognized. Attention is called to the importance of **routinely screening all prenatal** patients, **Rh positive** as well as **Rh negative,** for irregular antibodies capable of causing erythroblastosis.

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1. **Manual of Workshop on Hemolytic Disease of Newborn,** Council on Continuing Education, ASCP, 1964.
2. Hanson, D. J., et al. **Scientific Exhibit,** A.M.A., 1964 Annual Meeting.

STATEMENT OF OWNERSHIP

November 15, 1966

The **South Dakota Journal of Medicine** is published monthly at Sioux Falls, South Dakota, in the headquarters of the publisher. R. E. Van Demark, M.D., 1701 South Minnesota Avenue, Sioux Falls, is the Editor and the South Dakota State Medical Association, 711 North Lake Avenue, Sioux Falls, is the Publisher. The publication is owned by the South Dakota State Medical Association, a corporation. There are no bondholders, mortgagees, or other security holders.

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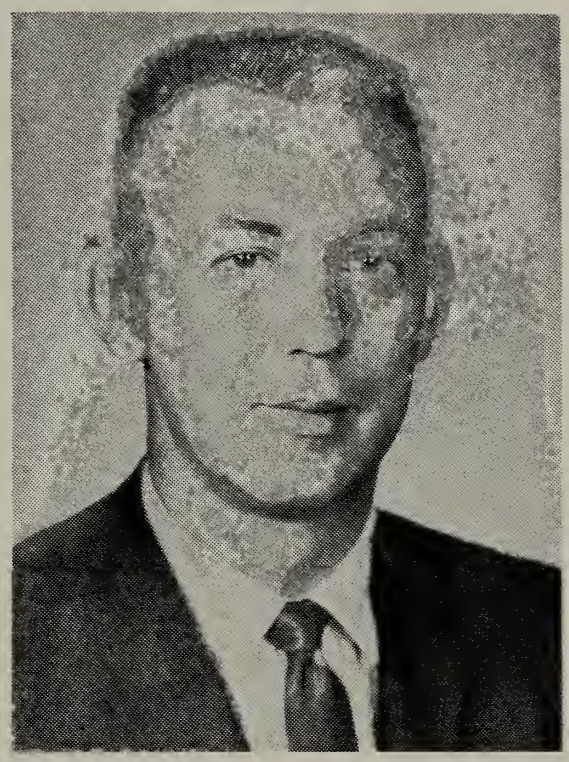
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PRESIDENT'S PAGE



The job of the Dean of the Medical School at Vermillion is important to every Practitioner of medicine in this state, and to the general public, as well. Not only will a great deal of the responsibility of Administration fall to this man, but also some plotting of the course of Medicine for years to come. Dr. Moulton, President of the University, expressed this to the Search and Selection committee at a meeting in his office a few days ago. He is interested in obtaining the best Dean possible and asks the help of all of our Medical Society. Suggestions from any individual or group from the SDSMA will be investigated.

Dr. Warren Jones, Dr. McVay, and I have been appointed to these committees, along with capable staff members from the school.

Dr. Moulton has assured us that he is in sympathy with the Society's expressed opinion that the position should be, if possible, filled by a physician.

Preston Brogdon, M.D.
President of the South Dakota State
Medical Association

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News Notes • Changes • Births • News

Pop's Proverb

Sometimes one must shock people to get their attention.

Announcement has been made of the publication of a new book by William B. Walsh, M.D., founder and president of Project Hope. The new book is entitled, **YANQUI, COME BACK!: The Story of Project Hope in Peru.**

This new book tells of the impact of the HOPE on South America, specifically Peru. When the HOPE first came to Peru its personnel was greeted with abuse; when it departed, the cry most frequently heard was "Yanqui, come back!"

Further information on availability of this new book can be obtained from E. P. Dutton & Company, 201 Park Avenue, South, New York, N. Y. 10003.

* * *

E. W. Urbanyi, M.D., Gettysburg, is attending an international convention for abdominal surgeons in Rome, Italy. Following the convention, Dr. and Mrs. Urbanyi will tour Austria; Germany; Switzerland; Paris and London.

* * *

D. W. Powers, M.D., a pathologist, has joined the staff of St. Luke's Hospital in Aberdeen, South Dakota.

During the meeting of the South Dakota Society of Internal Medicine in Rapid City, **Reuben Bareis, M.D.,** was elected president. Other officers elected include: **Clark F. Johnson, M.D.,** Yankton — president-elect; **H. Streeter Shining, M.D.,** Rapid City — secretary-treasurer; and **Warren Jones, M.D.,** Sioux Falls — trustee.

* * *

G. W. Mills, M.D., Wall, veteran physician, legislator and tourist operator, was awarded the Black Hills, Badlands and Lakes Association plaque for outstanding service to the travel industry at the annual meeting of the group in Rapid City.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

The Seventh District Medical Society held its first fall meeting October 4th in Sioux Falls. Sixty-five physicians were present for a business session and a discussion of the Medicare Program, which was presented by Richard C. Erickson, Executive Director of South Dakota Blue Shield.

* * *

Gill Memorial Eye, Ear and Throat Hospital, Roanoke, Virginia, announces to the profession its Fortieth Annual Spring Congress in Ophthalmology and Otolaryngology, April 3 through April 7, 1967. For further information, write: Superintendent, P. O. Box 1789, Roanoke, Virginia.

* * *

The Yankton District met on September 29, 1966, at the Black Steer Restaurant. Twenty-three physicians and their wives attended the meeting and met Dr. and Mrs. Preston Brogdon. Dr. Brogdon, President of the State Medical Association, made his official visitation to the District.

* * *

The names of the following physicians should be added to the Membership Rosters of the South Dakota State Medical Association.

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Meprobamate: Drowsiness may occur and can be associated with ataxia; the symptom can usually be controlled by decreasing the dose, or by concomitant administration of central stimulants. Allergic or idiosyncratic reactions: maculopapulor rash, acute nonthrombocytopenic purpura with petechiae, ecchymoses, peripheral edema and fever, transient leukopenia. A case of fatal bullous dermatitis, following administration of meprobamate and prednisolone, has been reported. Hypersensitivity has produced fever, fainting spells, angioneurotic edema, bronchial spasms, hypotensive crises (1 fatal case), anuria, stomatitis, proctitis (1 case), anaphylaxis, agranulocytosis and thrombocytopenic purpura, and a fatal instance of aplastic anemia, but only when other drugs known to elicit these conditions were given concomitantly. Fast EEG activity, usually after excessive dosage. Impairment of visual accommodation. Massive overdasage may produce drowsiness lethargy, stupor, ataxia, coma, shock, vasomotor and respiratory collapse.

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New York City Board of Health Forbids Secret Pasteurization

(New York City, 1906)

In New York City in 1906, 60 years ago, the New York City Board of Health forbade secret pasteurization of milk.*

Despite the fact that pasteurization destroys disease-producing bacteria, the New York City Board of Health did not fix time and temperature requirements for pasteurization until 1910. For the benefit of younger readers, following are some of the pathogenic bacteria destroyed by pasteurization:

Human tuberculosis, bovine tuberculosis, typhoid fever, paratyphoid fever, scarlet fever, streptococcus sore throat, undulant fever, diphtheria and dysentary.

The need for pasteurization was communicated to the American public, at least to a significant degree, through specific statements in sales and advertising that pasteurized milk would protect against specific diseases which might otherwise be a menace. Even the temperatures required for protection were cited.

Personally, I know that such selling was done, because in the late 20's and early 30's, I participated in it, upon literally hundreds of occasions.

*Preventive Medicine May Be Best Answer***

Had preventive medicine been universally practised in 1906, conceivably such method might not have been necessary. But preventive medicine was not generally practised in 1906 nor is it universally practised in 1966.

Such a goal is an ideal, hardly a fact accomplished. According to the Department of Defense, in the year starting July 31, 1964 to July 1, 1965, 930,088 men were examined for the armed forces. Of these 445,636, or 47.9%, were rejected for reasons of mental or physical health. Today, almost 50% of the American public has some kind of trouble with weight, being either too fat or too thin. Even one out of three children is alleged to have some difficulty in this regard.

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According to present statistics, one out of ten Americans may be doomed to spend part of his life in a hospital for mental or emotional disturbance. By no means has this problem been fully resolved with regard to its legal, biochemical, nutritional, sociological, or psychological aspects, any more than the problem of war has been completely resolved in human affairs.

Any reputable psychiatrist would be shocked at the suggestion that the problems of his profession might be resolved through truth by proclamation. Many times the present number of people should be interested in mental health.

By no present legislation may the American citizen be deprived of his right to information, through truth by proclamation. Presently he has the same right to information about his health as the raiser of livestock has to information about hogs.

True, some of the material by which minds may be fertilized may be criticized. Such is the price of freedom. Distortion for profit should certainly be discouraged. And the public should also be protected against the possibility of distortion of law through regulation denying the public the right to information.***

Such distortion could cut off the cultural growth of this nation at its roots, could mentally maim this nation into a second-rate power through medieval meddling of a kind abandoned more than 1,000 years ago.

Even preventive medicine must depend upon communication for its effectiveness rather than by policing through regulation.

For regulation must inevitably involve the weakness of individual opinion expressed as dogmatic truth.**** Such regulation must simply serve as a means of controlling advertising through labeling, beyond the intent of Congress, according to convenience, advantage or prejudice through truth by proclamation.

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* *Market Milk and Related Products, P. 106, Hugo H. Sommer, Ph.D., 1946, Madison, Wisconsin.*

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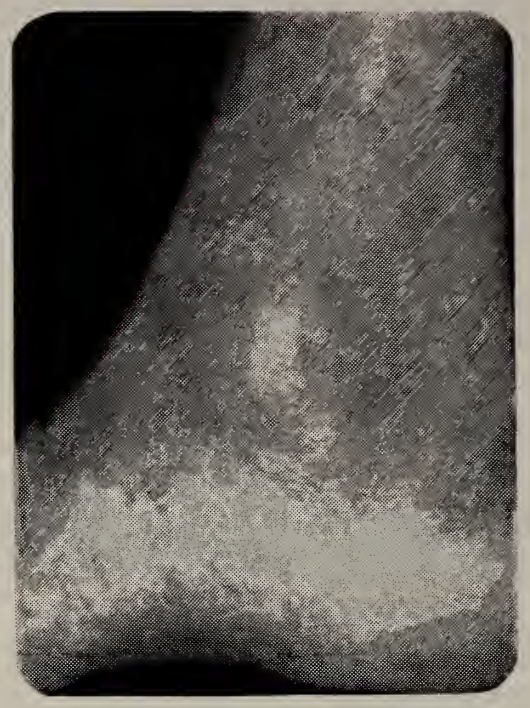
*** *With or without fortification, milk may hardly be described in a one-to-one relationship to any vitamin as with a vitamin pill. Fortification may simply amplify what is already present in unpasteurized milk.*

**** *Any attempt to withhold the vitamin C from cow's milk which is present in human milk — or to prevent the communication of scientific research to the public about this — may conceivably appear sixty years from now just as ill-advised as the action by the New York City Board of Health regarding pasteurization in 1906.*

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THE SOUTH DAKOTA

JOURNAL OF MEDICINE

**JOURNAL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION
AND THE SIOUX VALLEY MEDICAL ASSOCIATION**

Volume XIX **December, 1966** **Number 12**

CONTENTS

Management of Injuries of the Bone Structure of the Face 23
John L. Terry M.D.

Experience with Liver, Thyroid, and Brain Scanning 33
T. A. Ware, M.D.

Salicylism and Its Alkalinization and Intermittent Peritoneal Dialysis . 39
James N. Etteldorf, M.D.

PathCAPsule 41

Editorials 44

South Dakota Provides the Stimulus 44

Medic Alert Saves Lives 45

Deadwood Doctor 47

Report on AAGP Actions 51

President's Page 53

This Is Your Medical Association 54

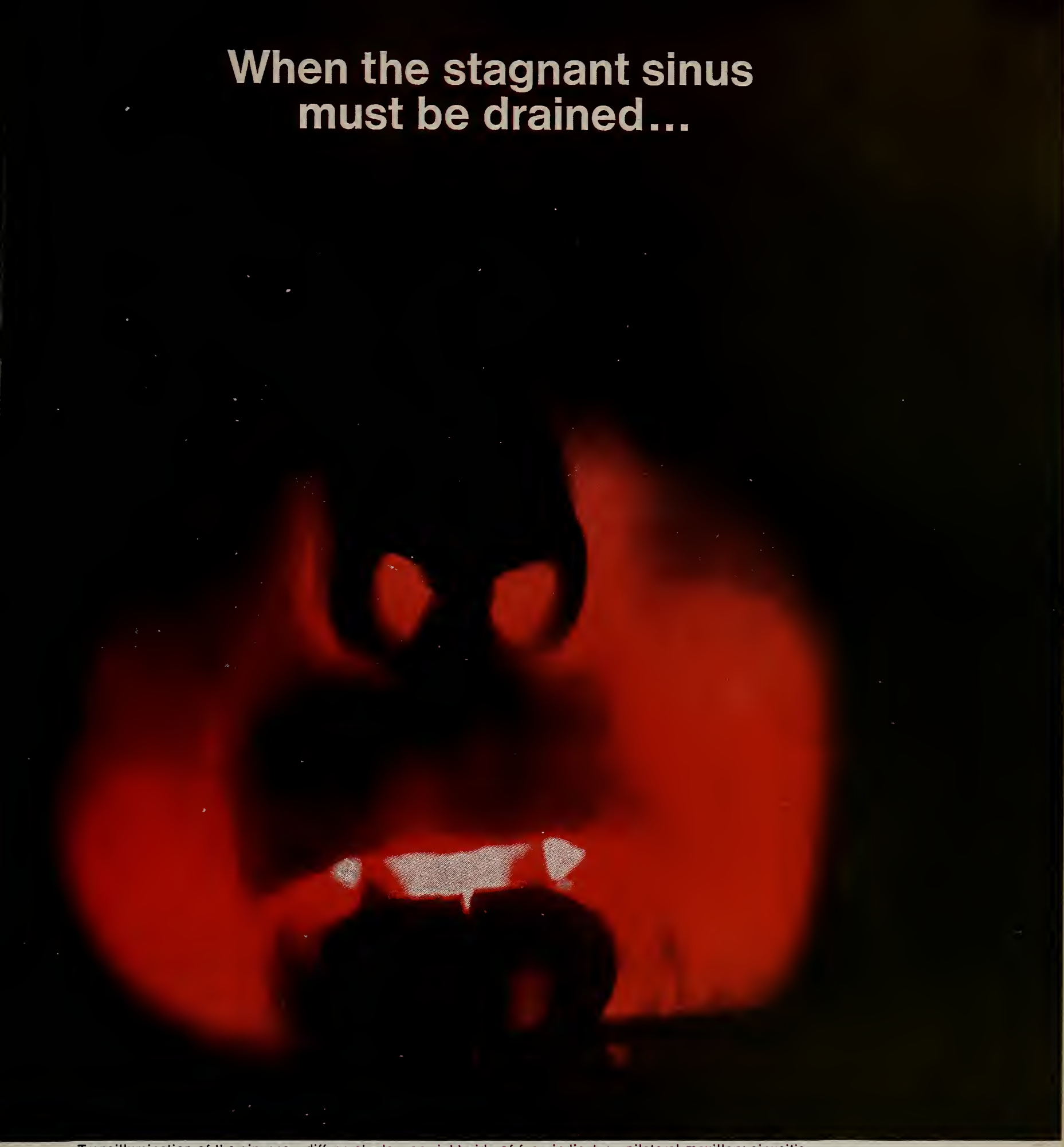
Index to Volume XIX 71

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Management of Injuries to the Bone Structure of the Face

By John L. Terry, M.D.
1100 Morse Road
Columbus, Ohio 43224

It is the obligation, opportunity and responsibility of the physician attending a patient with a facial fracture to return the patient to a state of normal function and appearance. The economic, sociologic and psychologic factors present in our currently competitive world make it necessary that an aggressive, well planned program be executed in the management of such patients in order to return them to an active productive life as soon as possible.[2]

Because of the uncovered and unprotected nature of the face, the incidence of injuries to this area is high when compared to other body regions. In this country the automobile is responsible for a large percentage of facial injuries, although there are many other etiologic agents encountered. In 1957 Braunstein[1] reported that injuries to the head and facial region occurred in 72% of automobile accident victims. There are some 38,000 traffic fatalities in this country each year, and for every person killed there are 116 injured. Therefore, there are about 4,500,000 injuries annually of which there are over 3,100,000 facial injuries. In the more highly industrialized and motorized areas of the mid-west, automobile accidents account for some 38% of facial fractures[3] while in another series reported from a crowded urban area[4] of lower economic and social stature, the automobile accounted for only 8% of such facial defects.

The management of facial fractures must be based on a rational knowledge of the function of the facial skeleton. The bones of the face provide a mechanism of support and protection for the eyes, naso-lacrimal ducts, the dentition and the olfactory-turbinate complex. The goal of the care of any osseous injury to such a supporting framework must be directed by the restoration of function of the supported structure primarily, and to the re-establishment of simple facial symmetry secondarily. When confronted with a fracture involving the dentition, it is not of primary importance that the fracture line per se be re-aligned, but that the dental occlusal plane be accurately re-established by interdental fixation. The same philosophy also applies to the care of fractures about the orbit in that the proper ocular dynamics must be restored in the manipulation of the bony fragments. In almost all cases the bone fragments will be found to be in the correct anatomic relation when this restoration of the functional element has been achieved.

One other fundamental in the consideration of face fractures is the fact that almost all such fractures are depressed fractures in that they are typically caused from the application of a force from the exterior of the face. Therefore the method of correction of such defects is through the medium of elevation of the segment in question. Various methods are employed in the maintenance of reduction of odd regions of the face and these will be touched upon individually.

The timing of the treatment of facial fractures must be predicated upon an evaluation of the patient's general status. It is axiomatic that the repair of facial soft tissue wounds and fractures be accomplished as soon as the patient's general condition is stable and that there is no known serious injury inside the various body cavities. The airway must be cleared and tracheotomy is occasionally indicated in those cases where tongue and hypopharyngeal support are impaired by loss of mandibular continuity. Serious intracranial injury and/or excessive pharyngeal bleeding may also be indications for tracheotomy.

PATIENT EVALUATION

Evaluation of the patient can be broken down into three productive areas; questioning, physical examination and radiographic evaluation. There are two phases in patient interrogation; one should deal with the manner of the accident or blow that has resulted in the facial fracture and the other should be directed at the changes the patient has experienced following the injury. In determining the manner of the accident it is possible to better visualize the direction of the forces involved and therefore allow the examiner to predict what structures have possibly been injured. The patient's own post-injury sensations are valuable adjuncts to

making a diagnosis in that he can relate whether or not his teeth are still in normal occlusion, whether there is now diplopia or analgesia involving various of the three branches of the fifth cranial nerve or a sensation of frank facial motion when the teeth are tightly closed.

Physical examination should start with inspection to determine if facial symmetry has been altered, as in a depressed fracture of the malar eminence or a laterally displaced fracture of the nose. A long appearing face in the presence of bilateral periorbital ecchymosis should alert one to the possibility of a cranio-facial separation. Examination of the dental arches may disclose a tear of the gingiva or gross dental mal-alignment indicative of a fracture through one or more of the dental arches (fig. 1).



FIG. 1

A medially displaced segmental fracture of the maxillary alveolar ridge is readily observed on physical examination.

A simple neurologic examination of the face should be done regarding the intactness of the above mentioned branches of the fifth cranial nerve. Any sensory loss is indicative of a bone defect producing compression of the peripheral nerve in that locale, as is so typical of the loss of sensation present in fractures involving the malar bone and floor of the orbit. Facial palpation is insignificant if the accumulation of edema has been too great. The supra and infra-orbital ridges should be gently felt, after which the upper teeth should be used as a handle to determine if there has been a cranio-facial separation. If such a separation has occurred, it will be possible to move the entire central third of the face by this maneuver. The zygomatic arches should be palpated as should the rami of the mandible, along with the malar prominences and the nasal skeleton.

It is not the intent of this paper to delve into the subject of radiographic examination of the face. Let it suffice to say that the usual films ordered for the examination of the patient suspected of having a "head injury" are usually inadequate as a means of facial bone evaluation. Probably the single one most contributory film taken of the face is the Waters view of the sinuses (fig. 2). This should be a routine projection in the study of possible face fracture and additional more specialized views can be ordered in the event there is some question after evaluation of this standard view.

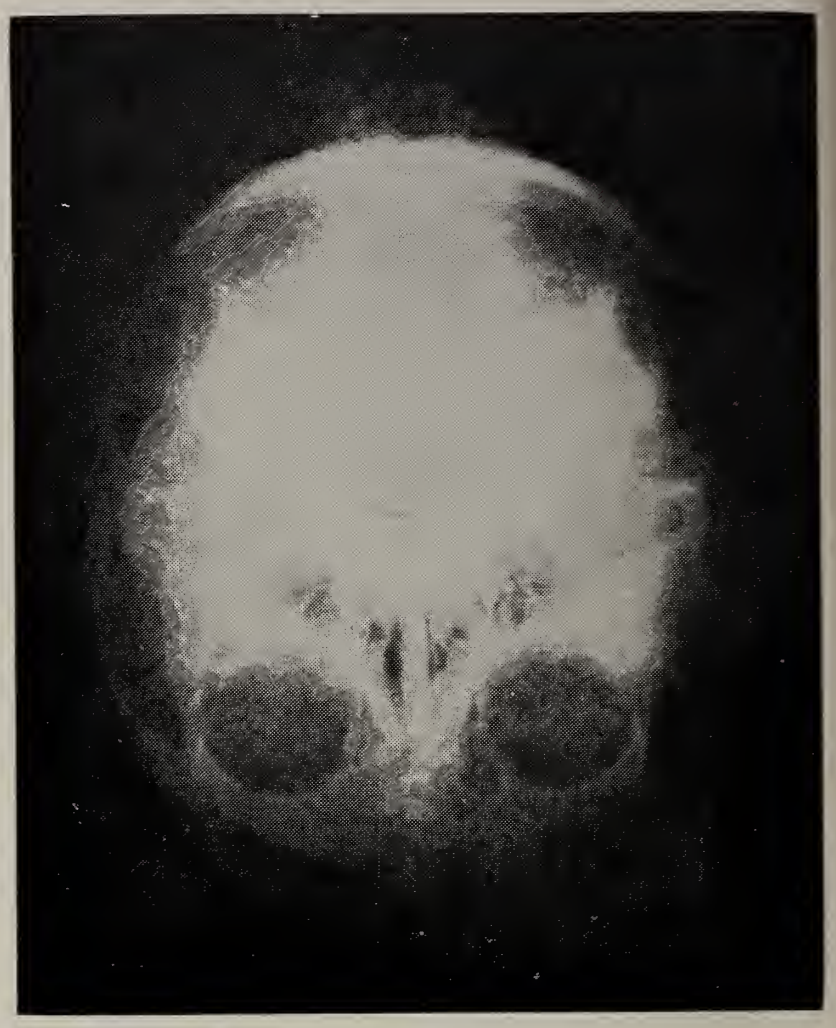


FIG. 2

Waters' view of the sinuses; an excellent screening film of the facial bones. The orbital margins, zygomatic arches, malar bones, nose, maxilla and mandible are visualized. The presence or absence of fluid in the sinuses can be determined.

If the facial fracture is seen early and if the patient's general condition will permit, an immediate reduction may be undertaken. Most often several hours have elapsed since the injury and the patient will present after the accumulation of a considerable amount of edema and occasionally a hematoma. In such instances, it is best to delay manipulation of the fracture until resolution of the swelling is accomplished. Fractures of various facial elements frequently influence facial contour and the closed reduction of such a fracture is predicated upon visual appraisal, which means of evaluation can be very inaccurate in the presence of facial swelling. From five to seven days are usually re-

quired for the resolution of facial edema and this time can be well spent in getting the patient ready for the oncoming surgical procedure. Oral hygiene is promoted by using some form of mouthwash in combination with hydrogen peroxide; the teeth should be brushed several times daily when feasible; the face should be washed with a hexachlorophene containing soap three to four times daily; the head of the bed should be elevated twenty to thirty degrees; cold compresses should be applied to the involved area initially for twenty-four hours, followed by warm compresses; one gram of vitamin C should be given daily in divided doses; and lastly, the patient may be given one of the now popular oral enzyme preparations to speed the resolution of the edema.

During this same waiting period one has the opportunity of consulting with the ophthalmologist in cases involving the orbital contents. A prosthetist should be called in to repair damaged dentures or make a new set of temporary dentures for the edentulous patient, which appliances will be used in the maintenance of the reduction of fractures through edentulous maxillary or mandibular segments.

The majority of nasal fractures are the result of a force applied to the nose from outside from either a head-on or a lateral direction. The direct blows to the nasal skeleton may cause only a simple fracture of the nasal bony prominence, or the force may have been of such a magnitude as to literally drive the nose back into the interorbital area. The laterally received forces result in a mere deviation of the nasal skeleton to the side of the mid-line. There are four considerations in the care of a nasal fracture; the possibility of injury to the naso-lacrimal apparatus, the displacement of the nasal septal components, the cosmetic defect produced by simple deviation away from the mid-line and cerebro-spinal fluid rhinorrhea resulting from a tear of the dura and arachnoid mater at the level of the cribiform plate. The latter situation is the most serious and is treated using Sulfadiazine to protect the sub-arachnoid space. In such cases it is wrong to attempt to maintain nasal reduction using an intra-nasal pack for fear of contributing to soilage of the meningeal spaces. This presents a rather enigmatic situation in that if a reduction of the fracture is not accomplished in the first seven to ten days, the chances of ever achieving a satisfactory reduction are very limited, and yet any manipulation of the fragments may result in contamination of the sub-arachnoid space. It is felt best to attempt to reduce such situation using an urethral sound and very minimal elevation forces early in the course of the disease, and if a reduction is not readily forthcoming, the possibility of a permanent deformity will have to be accepted. Such depressed nasal defects can be approached later using a bone graft or some alloplastic material to restore the nasal silhouette.

Bleeding into the conjunctival sac must be taken as evidence of lacrimal apparatus injury until proven otherwise by irrigation and/or probing. A bisected lacrimal duct or lacrimal sac should be repaired as soon as is feasible. Fine absorbable suture is recommended and the repair should be done over some form of stent, such as fine silastic rod or tubing, which stent should be left in situ for two to three weeks.

The laterally deviated nasal fracture is reduced using a blunt instrument such as a knife handle, and particular care must be given realignment of the nasal septum (figs. 3a-3b).



FIG. 3a

Nasal fracture resulting from a laterally applied force, causing deviation of the nose away from the mid-line. Note the typical peri-orbital ecchymosis and facial edema.

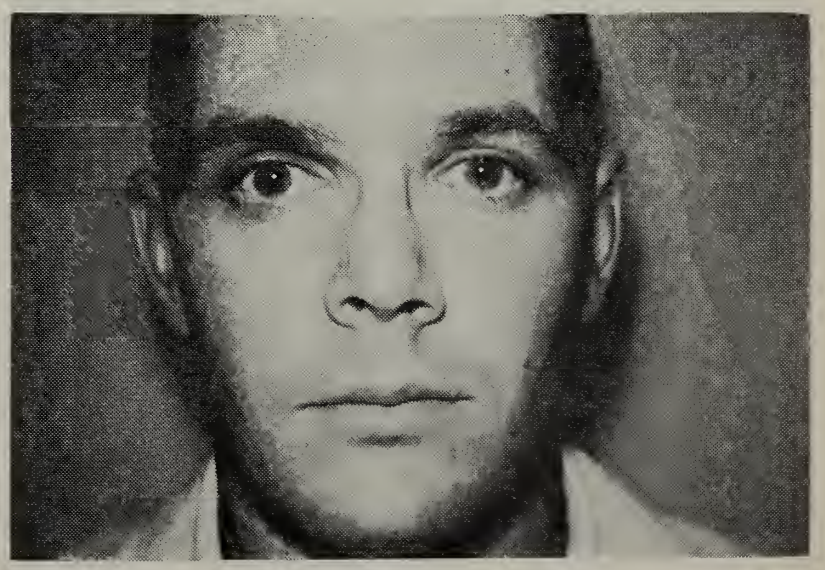


FIG. 3b

The nasal fracture is replaced in the mid-line of the face and splinted externally for seven to ten days.

After the internal and external aspects of the fracture are correctly repositioned, an Adaptic (R) nasal pack is inserted to maintain the septal reduction and a splint is placed over the exterior of the nose to hold the nose in the facial mid-line. In those cases of markedly posterior displaced nasal fractures, it is almost mandatory that the reduction be held by using medium gauge wire sutures in a through and through fashion placed at the base of the nasal skeleton and tied over large metal plates (fig. 4a). These plates should be left in place for from ten to fourteen days and great care must be taken in their application so as to avoid pressure necrosis of the lateral nasal skin.



FIG. 4a

Frontal view of a pyramidal fracture of the nose with posterior displacement.

ZYGOMATIC ARCH FRACTURES

There are two considerations in the management of depressed fractures of the zygomatic arch. In deeply depressed defects of this narrow arch, the fragments may be displaced medially to a sufficient degree to impinge on the coronoid process of the mandible and interfere with the normal range of excursion of the lower jaw. A lesser problem is that of the cosmetic de-



FIG. 4b

Lateral view of pyramidal fracture showing cerebrospinal fluid rhinorrhea.



FIG. 4c

Reduction of pyramidal fracture maintained using trans-nasal monofilament stainless steel wire tied over metal plates.

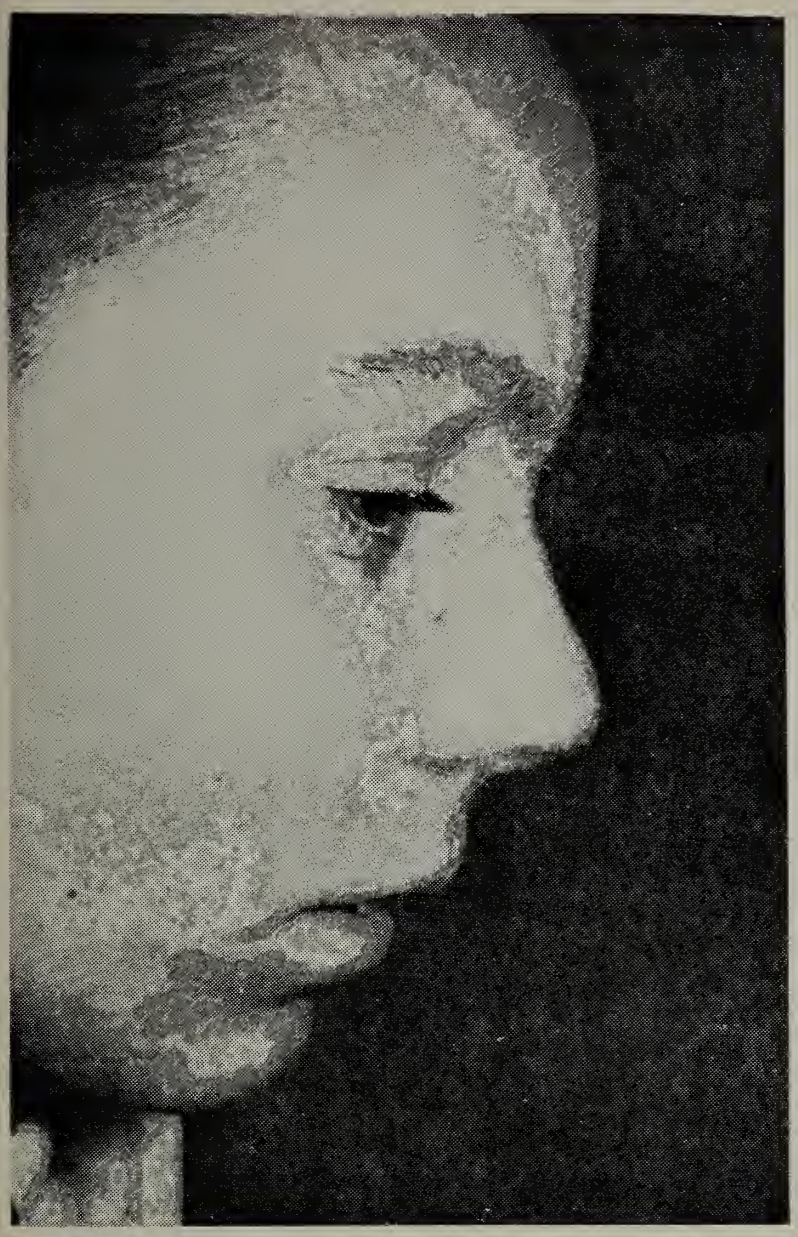


FIG. 4d

Appearance after removal of trans-nasal fixation.

fect caused by the depression of this superficial arch of bone. In either event the elevation of this fracture is accomplished by the Gillies approach, consisting of a small incision in the temporal scalp with the temporalis fascia being incised for the introduction of a long blunt instrument which may be passed behind the depressed bone fragments to achieve their elevation. If the fracture site is stable following reduction, a pack will not be necessary provided the patient does not press on the wound in the early post-operative period. In cases of unstable reductions, a small amount of a rubber shod pack may be introduced behind the fragments to preserve the reduction until healing has started, which would be ten to fourteen days.

FRACTURES OF THE ZYGOMA

Fractures of the body of the zygoma are sometimes referred to as malar or cheek-bone fractures. This bone is frequently involved in facial injuries in that it is a bony prominence of the face and often represents the leading point of contact when the head is suddenly stopped by striking a dashboard, or if the individual has been struck by a fist. All such fractures are depressed in nature and extend to a greater or lesser extent into the floor of the orbit (figs. 5a-c). The diagnosis is best made by inspection for asymmetry of the cheek prominences if the patient is seen early after the injury. If, however, much edema has accumulated, the involved side of the face may present as the more prominent side and entirely mask the fact there is a true depressed defect present. The finding of hypesthesia in the area of distribution of the infra-orbital nerve is almost pathognomonic of this fracture, whether or not there is radiographic evidence of a bone defect. Involvement of the floor of the orbit may be of sufficient degree to produce diplopia and a ptosis of the optic globe. It is a very unwise assumption to decide the patient's diplopia or ptosis are a result of simple orbital edema and that these complaints will resolve when the edema clears. If such complaints persist for more than four or five days, the floor of the orbit should be explored for a defect allowing the orbital contents to herniate inferiorly into the maxillary sinus.

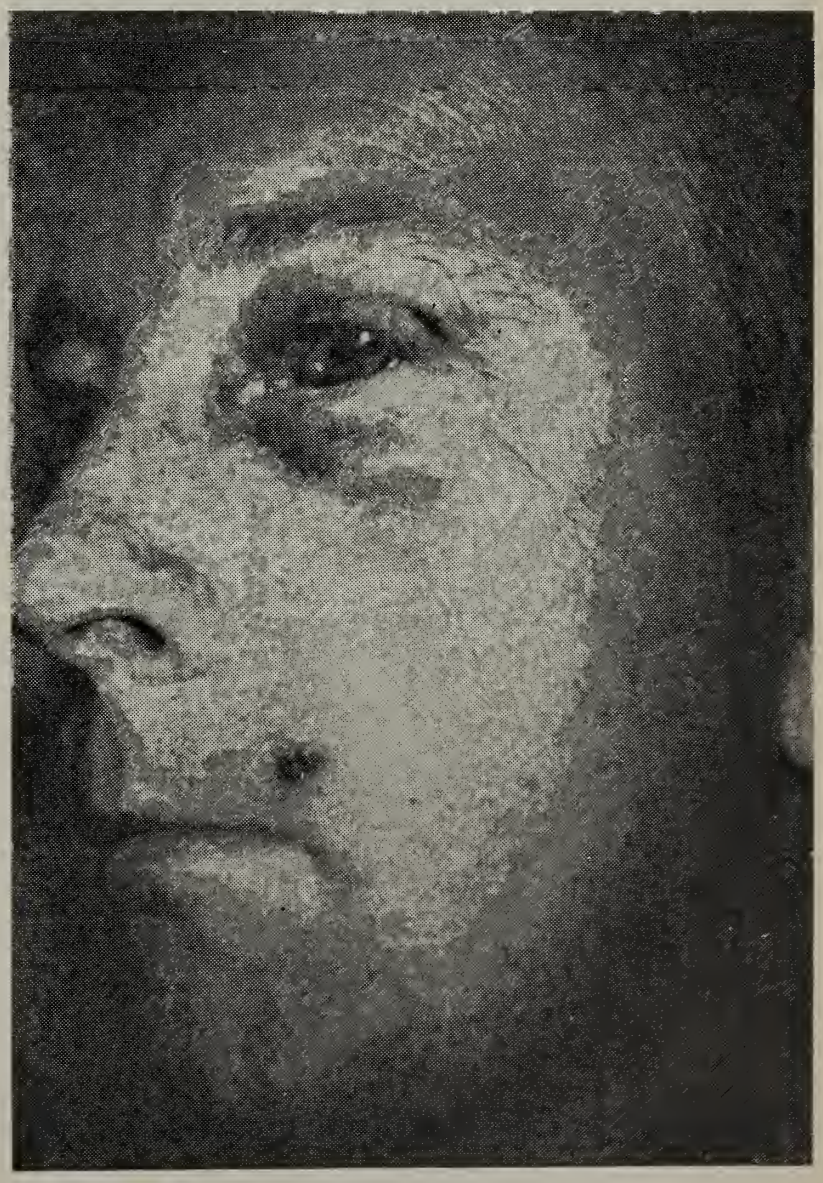


FIG. 5a

Typical depressed fracture of the body of the zygoma (malar bone).

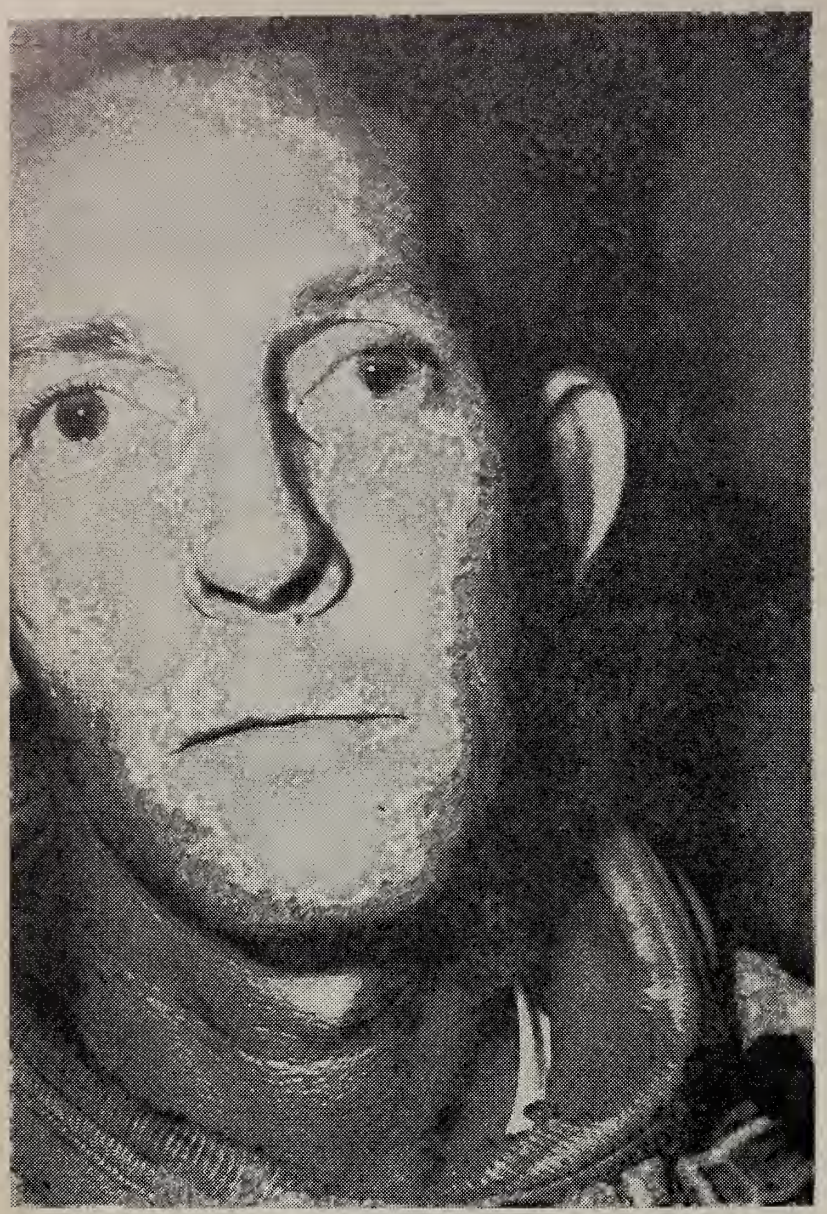


FIG. 5b

Reduction by Caldwell-Luc approach. (The ophthalmologic aberration on the left ante-dated the accident.)

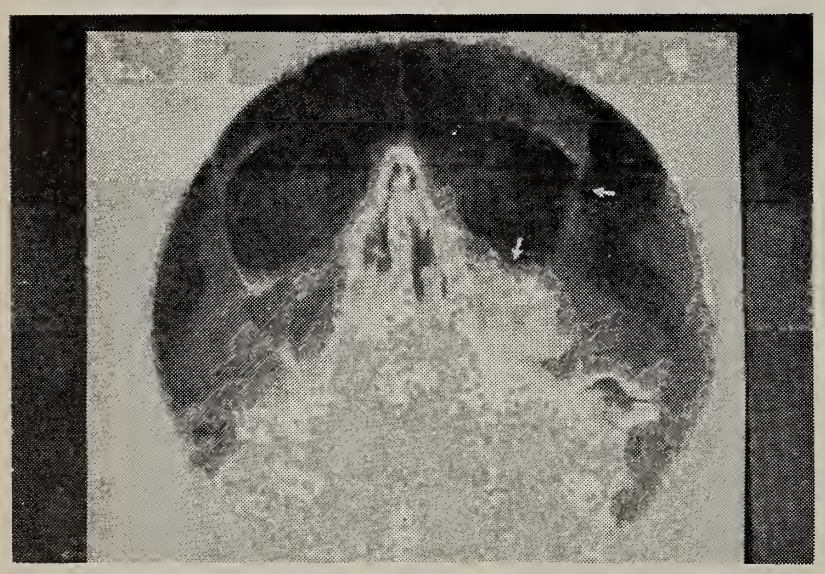


FIG. 5c

Waters' view of a depressed fracture of the malar bone showing blood in the maxillary sinus along with fracture lines through the lateral orbital rim and the inferior orbital margin. The arch of the zygoma is usually involved in this type fracture, but is not apparent on this particular film.

The preferred approach to this fracture is the transoral Caldwell-Luc procedure, making an incision in the upper buccal sulcus and entering the anterior wall of the maxillary sinus. After aspiration of the usual hematoma, the floor of the orbit can be inspected and any herniated orbital contents returned to their proper anatomic positions. Also from this vantage point, the depressed fragments can usually be reduced using a large urethral sound as a lever. The maxillary sinus is then packed with a sufficient length of rubber shod iodoform gauze to preserve the reduction. Some operators prefer to use a Foley catheter placed in the antrum with seventeen to eighteen cubic centimeters of sterile solution in the bag to maintain correct bone position. Either the packing or the Foley catheter can be brought out through the mouth and either should be removed after about ten days. During this time it is well to have the patient maintain proper oral cleanliness using a mouthwash solution frequently along with periodic brushing of the teeth.

There is an occasional case where the simple expedient of a Caldwell-Luc approach and antral packing will not suffice to maintain reduction of the zygoma. The only recourse in such a situation is to make a lateral and an infra-orbital incision in the proper skin planes and hold the fragments in position by wire fixation (fig. 7).

SUPRA-ORBITAL RIDGE FRACTURE

This is a seldom encountered lesion that greatly interferes with the attempt to reduce the often associated fracture of the body of the zygoma. The supra-orbital ridge fracture is a form of rotation-depression fracture which results in the displacement of the fragment into the superior aspect of the orbit. The globe is of necessity depressed by the newly positioned supra-orbital ridge, and is forced into the floor of the orbit. This situation is typically seen in conjunction with a fracture of the zygoma with ptosis of the globe (fig. 6). All efforts to elevate the globe will be in vain until the offending supra-orbital ridge is first removed from the superior orbit. An open reduction is necessary to replace the mal-positioned ridge, and wire fixation of the fragments is usually indicated.

Fractures of the frontal sinus are frequently associated with overlying facila lacerations and the debridement of the wound dictates that the poorly vascularized bone fragments present be discarded. If there is a considerable amount of bone that has to be debrided, there will be a very noticeable cosmetic defect to be dealt with at a later date (fig. 8). These resulting depressed defects are most often treated by the insertion of a silastic implant, although a bone graft may be used if desired. It is customary to wait until a scar revision is to be done; then do the im-



FIG. 6

Orbital ptosis after failure to recognize depressed fractures of the supra-orbital ridge and the malar bone. Treatment consists of internal wire fixation of the supra-orbital ridge fragment and a Caldwell-Luc with elevation of the malar bone and floor of the orbit.



FIG. 7

Malar fractures that fail to maintain reduction by antral packing are treated by open reduction and internal fixation using #26-28 gauge stainless steel wire. Small incisions are made in the skin lines over the areas involved.

plantation at the same time, which is usually many months after the accident. It always is preferable to install any alloplastic implant



FIG. 8

Depressed fracture of the frontal sinus. This defect has since been corrected by a silastic implant.

through an incision remote from the site in question in order to diminish the chances of extrusion of the material implanted. Simple depressed fractures of the frontal sinus may be elevated through a brow incision and the reduction maintained by installing a short segment of a rubber shod pack, which should be removed in seven to ten days.

FRACTURES OF DENTITION BEARING BONE

For the sake of brevity, fractures of the maxilla and mandible can be discussed together in that their management is predicated upon the re-establishment of dental occlusion. The most satisfactory reduction of such fractures can be had in those patients with intact dentition. As alluded to earlier, it is not the finite replacement of the bone fragments that is of importance in these fractures, it is rather the preservation of dental occlusion. Both goals can be had by placing the teeth in their proper occlusal plane and holding that position with arch-bars and elastic inter-dental fixation (fig. 9).



FIG. 9

Fractures of either the mandible or the maxilla, or both, are treated by the restoration of dental occlusion. In patients with suitable dentition the use of arch-bars and inter-dental elastic traction is the most direct means of re-establishing dental occlusion while the fracture mends.

Fractures of the maxilla are less common than some of the above mentioned fractures because the maxilla does not represent much of a prominence. There are several types of maxillary defects encountered including the segmental alveolar ridge fracture (fig. 1), the total alveolar ridge fracture, the fracture of the hard palate and the cranio-facial separation which includes the entire maxilla. In edentulous patients it is necessary to have either the patient's own denture or a temporary prosthesis available, which plates can be wired to the alveolar ridges in a circumferential fashion after any gross malalignment has been corrected by manual means. After the fragments are stabilized in this fashion they can then be secured to the mandible through elastic inter-dental fixation, using either the mandibular teeth or a circum-mandibular wire-fixed prosthesis as the anchoring mechanism. The inter-dental traction is kept in place for a six to twelve week period, depending upon the severity of the break and the age of the patient.

Palate fractures usually are not a major problem providing the adjacent maxillary segments can be held in place. Manual reduction of the displaced hard palate is simple to perform and wire fixation is not normally indicated. The blood supply to this region is such that healing takes place rapidly and without sequellae.

The mandible[5] presents a somewhat different picture than that of the maxilla in that there are numerous muscle attachments that cast their influence upon the fragments involved. Briefly, the digastrics, geniohyoid, genioglossus and mylohyoid tend to retrodisplace symphyseal fragments; the summation of forces of the two pterygoids, the temporalis and the masseter is one of elevation and internal displacement of posterior fragments; sub-condylar fragments are strongly rotated medially by the action of the pterygoids. Again the same goal of management of mandibular fractures is the preservation of dental occlusion as had by the application of arch-bars and inter-dental elastic traction in dentulous patients, while open reduction and internal wire fixation may have to be employed in the edentulous patient (fig. 10). Severely comminuted fractures in the edentulous patient may well require external splinting via circum-alveolar ridge-wired prostheses to add support to the internal wire fixation.



FIG. 10

Mandibular fractures with an edentulous posterior fragment often must be treated by open reduction and internal fixation. Note the use of two drill holes in one fragment and only one in the opposing segment. Wires applied in this fashion tend to completely immobilize the fracture site.

The duration of immobilization of mandibular and maxillary fractures varies some with the age of the patient; from eight to ten weeks usually is sufficient in those persons before their fifth decade, while from twelve to fifteen weeks may be required in older patients, and this is especially true in those edentulous individuals who manifest alveolar ridge atrophy and osteoporosis of the scant remaining bone.

Fractures in the sub-condylar region of the mandible often present the problem of marked internal rotation of the condylar fragments. In such instances it is usually necessary to perform an open reduction with intramedulary pin fixation via the inferior aspect of the angle of the mandible, rather splitting the small superior fragment on the advancing tip of the pin. The pin can be buried under the skin at the angle of the mandible and removed after six to eight weeks. In those cases of undisplaced fractures

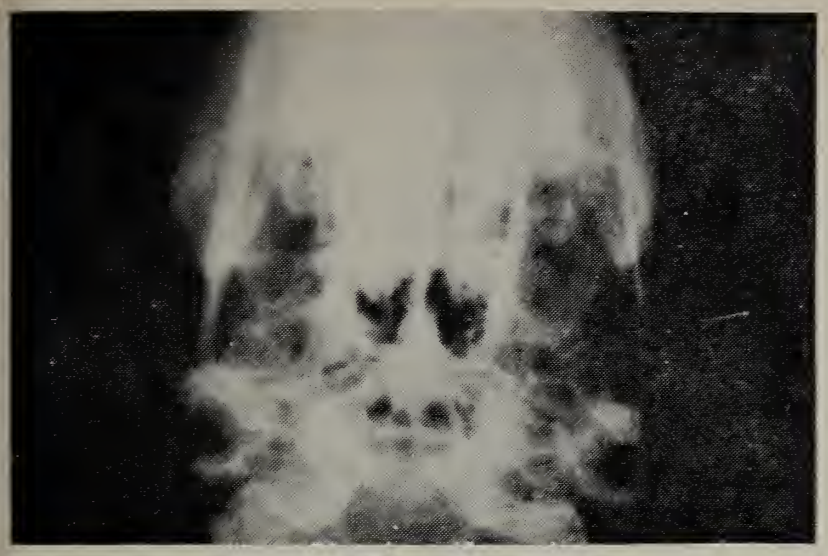


FIG. 11

A sub-condylar fracture of the mandible. This type fracture is treated using arch bars and inter-dental elastic traction for periods of 6-12 weeks. Open reduction is indicated only by marked internal rotation of the condylar fragment.

of the condyles, simple inter-dental elastic traction for a similar time interval will suffice (fig. 11).

MULTIPLE FACIAL FRACTURES

The limited scope of this paper does not allow a finite discussion of all the various combinations of facial fractures that may be encountered. Suffice it to say that the majority of such facial fractures can be adequately controlled if one adheres to the teaching that the upper fractures are reduced first, usually using open reduction and wire fixation via small drill holes, with the lower fractures being progressively attached to the more superior wire-anchored fragments. A common example to cite is the patient with a cranio-facial separation and a fracture of the mandible (fig. 12). The superior segment consisting of the maxillae, the nasal complex and the two malar bones are attached to the frontal region by open reduction and wire fixation at the lateral orbital rims. The mandibular fragments are reduced and held in place using an arch bar that is attached by elastic inter-dental traction to a similar bar applied to the maxillary dentition. If additional stability is desired, long loops of wire can be passed through the holes in the lateral orbital rims and around the maxillary arch bar, which improves the fixation of this large central third of the face segment.



FIG. 12

Multiple facial fractures are frequently treated by progressively wiring the more superior fragments to the intact lateral orbital rims, and then attaching the lower fragments to the previously reduced upper segments. Note the wire fixation of the malar bone to the lateral orbital rim, with the maxillary and mandibular fractures being held superiorly with a wire passed through the same lateral orbital rim hole. The arch bars insure restoration of dental occlusion.



FIG. 13a

Compound fracture extending into the right orbit and base of the nose. The attachment of the right medial canthal ligament has been rendered ineffective by the fracture, extending into the medial wall of the orbit.

There are many exotic external fixation devices designed for the treatment of facial fractures, some of which are believed to contribute more to patient discomfort than to the care of the bone defect in question. Internal fixation can usually be adapted to manage almost all facial fracture situations, and it is far easier for the patient to remain free of attachment to the bedding than with some form of out-rigger.

There is the occasional situation presented where one or the other of the canthal ligaments is rendered ineffective due to a fracture in the locale (Figs. 13a-13b). This is a very important finding and one that deserves immediate attention. Failure to reattach a separated canthal ligament results in the permanent loss of facial symmetry due to a subsequent inequality of the palpebral fissures. This most distressing post-fracture sequella can be obviated by the open reduction and wire fixation of the fragment to which the canthal ligament is anchored. Such defects are frequently associated with lacrimal apparatus injury when the medial ligament is involved.

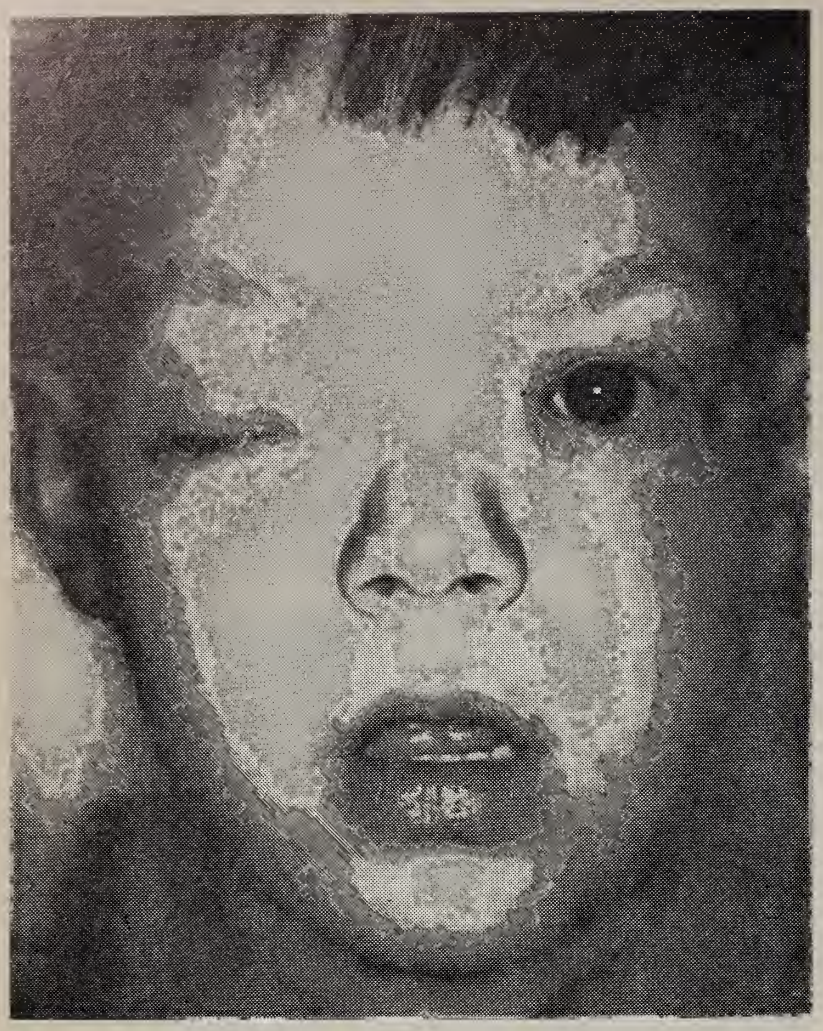


FIG. 13b

Note the increased inter-canthal distance caused by failure to adequately reduce the fracture involving the medial wall of the orbit. The patients condition would not permit undue prolongation of the anesthestic and the wound had to be closed as rapidly as possible.

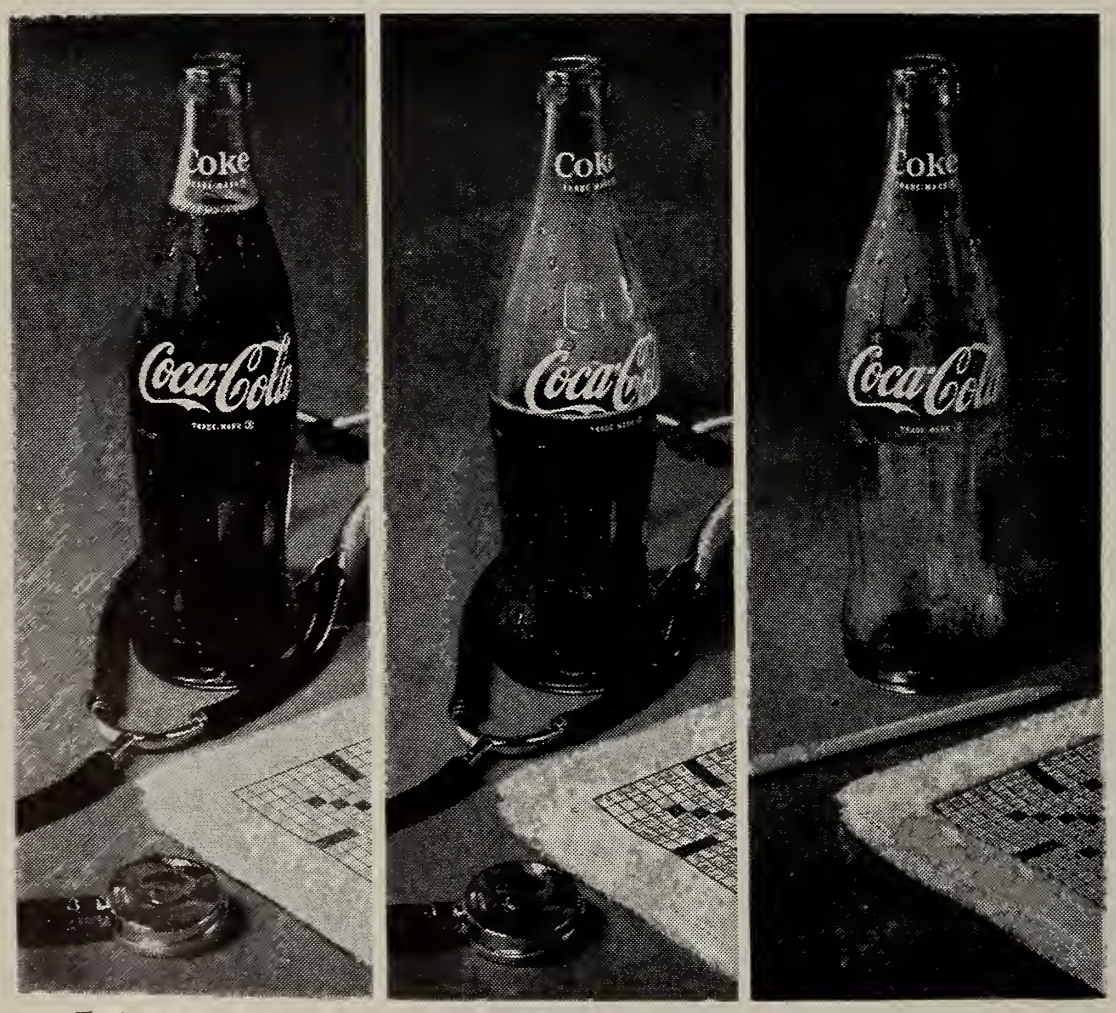
Every effort should be made to preserve any loose teeth present and they should definitely not be wantonly extracted. In fact, it is common practice to replace avulsed teeth into their sockets and anchor them with wire fixation around an arch bar. Survival of such teeth is frequent providing good initial fixation can be maintained.

SUMMARY

The facial skeleton serves as support and protection for the eyes, olfactory-turbinate mechanism and the dentition. Secondarily it provides a source of attachment for the musculature necessary for the operation of the above structures, as well as forming the foundation for usual and acceptable appearance. Management of fractures of this important foundation material must be directed toward re-establishment of all the above alluded to functions and properties.

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EXPERIENCES WITH LIVER, THYROID, AND BRAIN SCANNING*

By
T. A. Ware, M.D.
Sioux City, Iowa

Various organs in the body are amenable to scanning techniques employing radioactive isotopes. A fairly complete list of organs which have been scanned includes: thyroid, brain, liver, kidney, spleen, bone, pancreas, heart, and lungs. This presentation concerns scanning of three of these organs: liver, thyroid and brain.

The equipment used at St. Joseph Mercy Hospital, Sioux City, consists of a Picker magniscanner. The important elements of the scanner include a 5 inch sodium iodide crystal enclosed in a collimator, a photomultiplier tube, a pulse height analyzer, and a spectrometer. Gamma rays emerging from the organ studied strike the sodium iodide crystal, producing scintillations, which are converted to electrical pulses by the photomultiplier tube. The pulse height analyzer measures the energy of the gamma rays. The spectrometer analyzes the information from the detector and sifts out the important information. The information is then recorded both on x-ray film as dark dots, and on paper in the form of dots of various colors depending on the amount of radioactivity being recorded.

The principal agents used for liver scanning are I131 rose bengal, and Au (gold) 198. Our experience has been with I131 rose bengal.

The technique for liver scanning consists of the intravenous injection of 100 to 150 microcuries of I131 rose bengal, followed by scanning over the liver, begun about 5 to 10 minutes after injection. I131 rose bengal is rapidly cleared from the blood, and excreted with the bile into the gastro-intestinal tract. The concentration in the liver is changing as the scan progresses. This can be reduced by giving a blocking dose of non-radioactive rose bengal ten minutes before administration of radioactive material. It is important to scan toward the head, so that the gallbladder area has been passed by the time of large concentration in the gallbladder.

Although we have not used Au 198, it has certain advantages and disadvantages. It has the advantage of pure emission at 411 kev, and less scatter, and the concentration is not changing as the scan progresses. However, the radiation dose to the liver is considerably greater than with I131 rose bengal.

The principal use of liver scanning is in the demonstration of tumor masses, where primary or metastatic tumor is suspected. Tumors show as negative areas of reduced or absent uptake. The absence of uptake is not specific for tumors, since other conditions such as liver abscess and echinococcus cyst also produce the same finding.

An example of a liver scan of a case of metastatic carcinoma is shown in illustrations 1 and 2. The dark areas are relatively normal liver,



Figure 1 Liver Scan — Metastatic Carcinoma.

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* Presented at the Sioux Valley Medical Meeting, February, 1966.

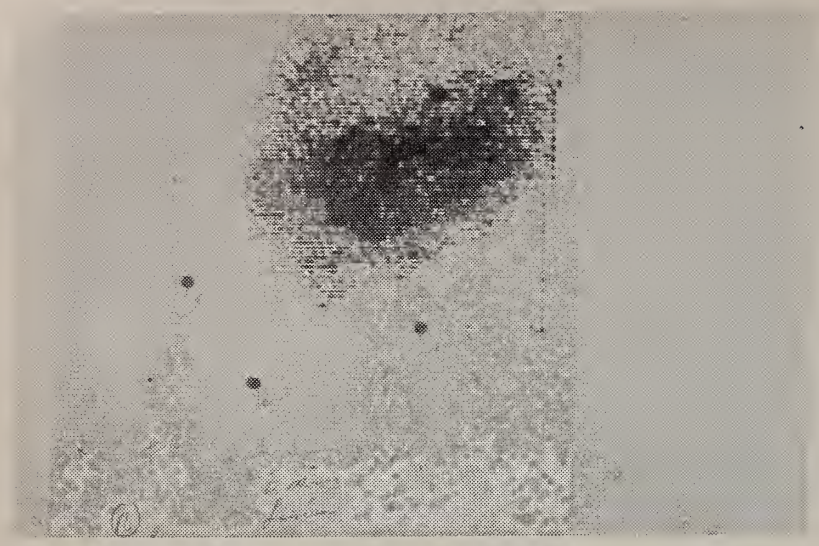


Figure ♯2 Same case as ♯1 Metastatic Carcinoma.

while the areas of reduced uptake, shown as lighter areas, represent areas of involvement by tumor.

THYROID SCANNING

The principal uses of thyroid scanning in our experience have been in the delineation of suspicious thyroid nodules, and the study of suspected or proved malignancy. The scan should show whether the nodule is hot (one which takes up iodine) or cold, and may show the presence of other unsuspected nodules. Most cancers fall in the group of cold nodules, although no more than 25% of cold nodules will be malignant. If the nodule is hot, or if it is not delineated by the scan, its chances of being benign are excellent.

Our technique is to administer at least 100 microcuries of I131, and scan the thyroid 24 hours later. We take an iodine uptake at the same time. After thyroidectomy, when a search is being made for residual or recurrent carcinoma, a much larger dose may be necessary.

Additional procedures which occasionally may be used include a suppression scan, and stimulation scan. A suppression scan consists of a repeat scan after 21 days of suppression by 0.3 mg. thyroxin. It is used when a probable hot nodule is identified on the first scan, but is only slightly more functional than surrounding tissue. If the area is a hot nodule instead of prominent lobulation of normal tissue, the suppression scan will then show a nodule, with the remainder of thyroid not shown, or suppressed.

A stimulation scan consists of a repeat scan after thyroid stimulating hormone is given. This is done where the first scan shows one-sided function. If the opposite lobe is suppressed on the first scan, it will be shown after a stimulating scan is done.

Illustrations number 3 and 4 show a large cold nodule in the left lobe of the thyroid.



Figure ♯3 Thyroid Scan — Large Cold Nodule.

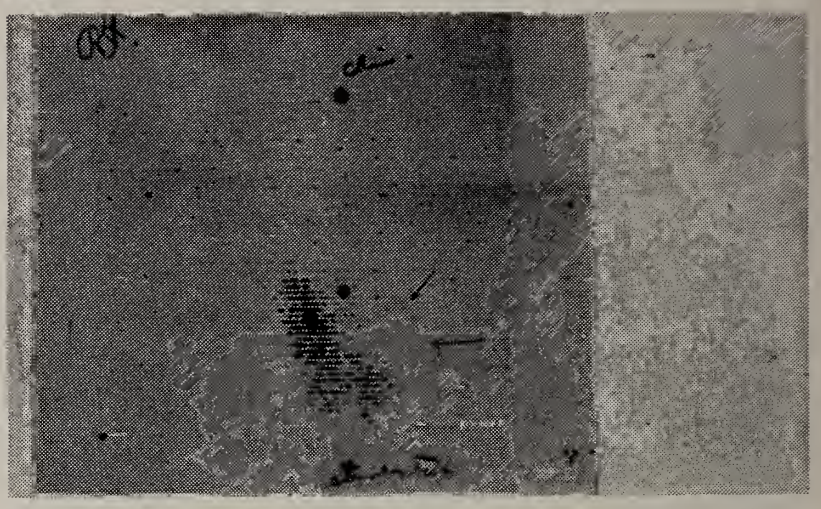


Figure ♯4 Large Cold Nodule same case as ♯3.

Illustrations number 5 and 6 show a large hot nodule in the isthmus and left lobe in a patient who was moderately hyperthyroid. Both anterior and lateral scans were done.

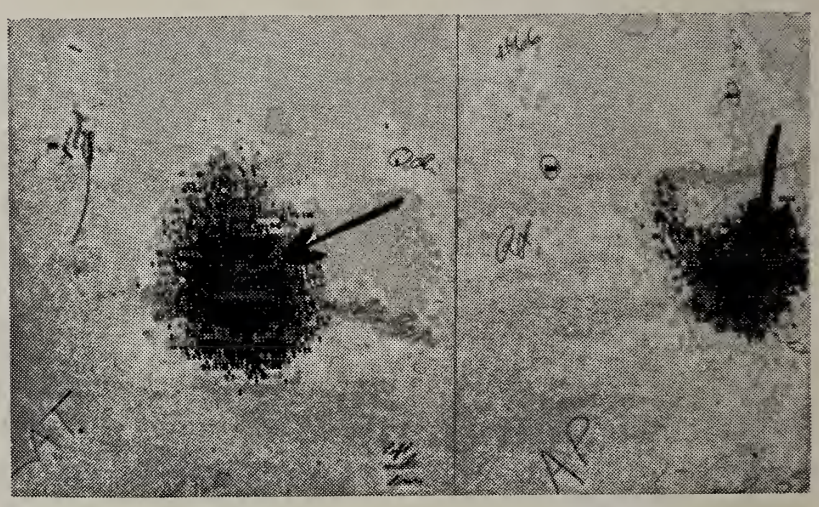


Figure ♯5 Thyroid Scan — Large Hot Nodule.

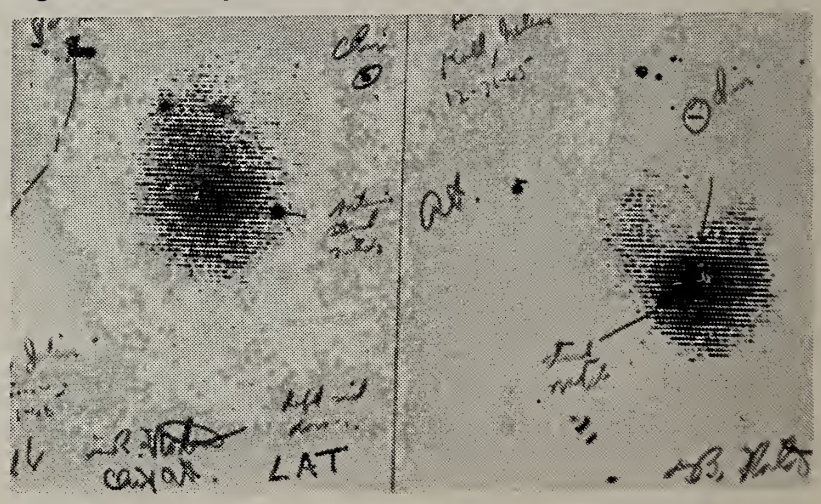


Figure ♯6 Large Hot Nodule same case as ♯5.

Illustrations number 7 and 8 show a scan taken solely for the purpose of ruling out a substernal thyroid. Although this was done, the scan incidentally showed small colloid nodular areas in both lobes.



Figure ♯7 Thyroid Scan — Taken to rule out Substernal thyroid; shows multiple small Colloid Nodules.

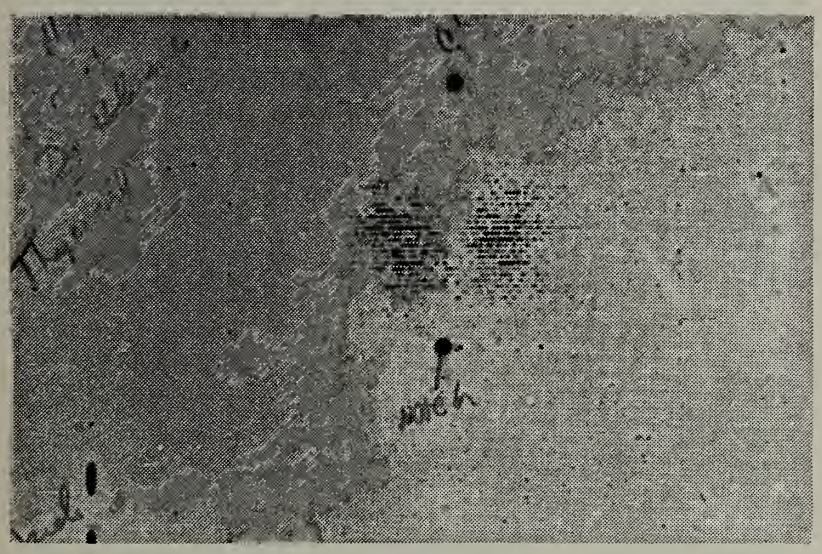


Figure ♯8 Thyroid Scan — Taken to rule out Substernal thyroid; shows multiple small Colloid Nodules, same case as ♯7.

Illustration number 9 shows a large cold nodule in the right lobe and small nodule in the left lobe. The diagnosis was colloid nodular goiter.

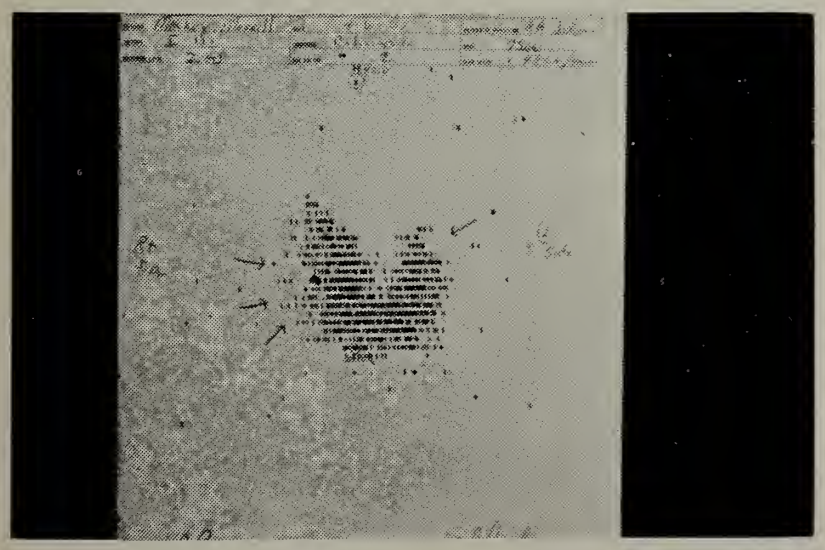


Figure ♯9 Thyroid Scan — Right Lobe, large cold Nodule; Left Lobe, small cold Nodule.

BRAIN SCANNING

The principal use of brain scanning is the delineation of mass lesions in the brain. Although the great majority of lesions shown prove to be tumors, the demonstration of lesions is not specific for tumors, since numerous other conditions, such as brain abscess, subdural hematoma, infarction, arteriovenous fistula, and intracerebral hemorrhage, also are shown as areas of increased uptake.

In our series, most cases were done with I131 serum albumin, the remainder with Hg 203 chlormerodrin. The technique with I131 serum albumin was to inject about 3 microcuries per kilogram intravenously, and scan 24 hours after injection. If Hg 203 was used, a dose about twice that for I131 serum albumin was used, and the scan was done four to six hours after injection. Mercury has a longer half-life, and somewhat lower blood radioactivity levels, while iodine has a much lower dose to the kidneys. Most studies indicate there is little difference in accuracy of diagnosis between the two agents.

Our routine is to take an antero-posterior and at least one lateral scan. In some cases, we have also taken both lateral scans, and a postero-anterior scan if signs point toward the posterior fossa.

Illustrations 10 and 11 show an example of a normal brain scan.

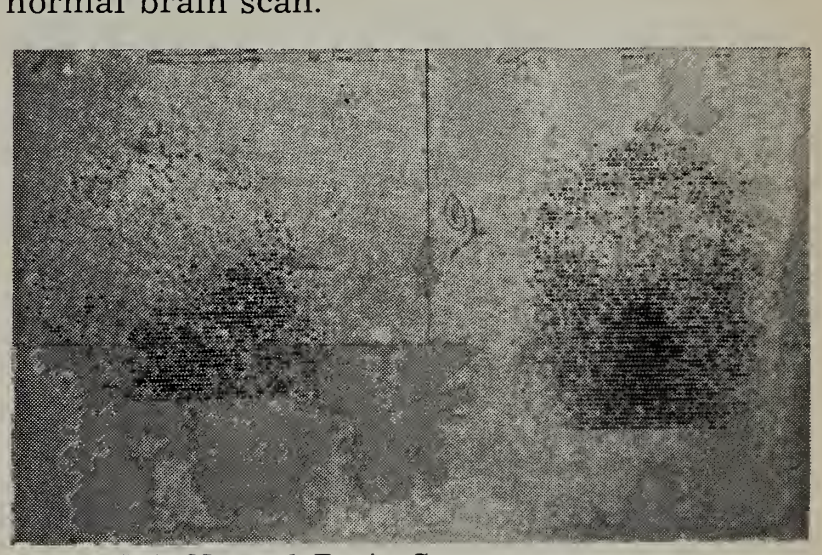


Figure ♯10 Normal Brain Scan.

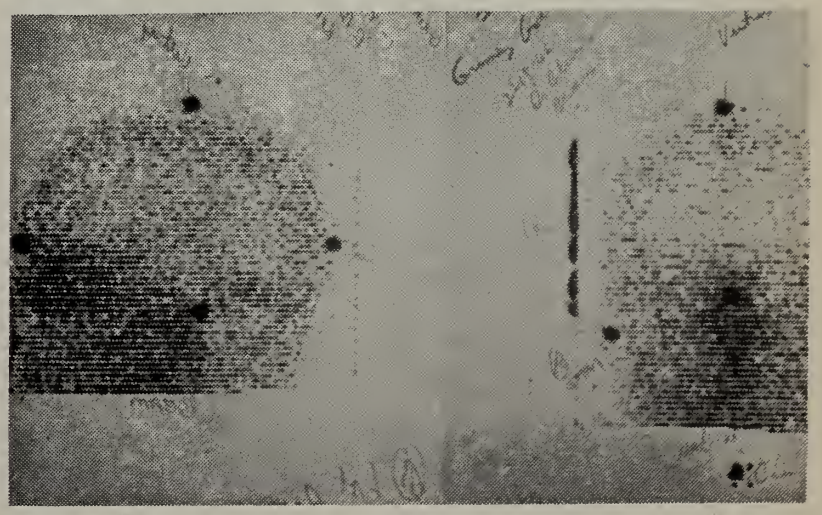


Figure ♯11 Normal Brain Scan, same case as ♯10.

The normal brain is outlined on a scan as a light area or region of low count rate surrounded by more vascular structures, which appear darker because of higher count rate. Areas of normal higher count rate include the scalp, calvaria, and superior sagittal and transverse sinuses. The nasal cavities, and accessory sinuses also show high count rate.

In most series of brain scans, 65 to 80% of intracranial tumors had positive scans. However, the accuracy depends somewhat on the type of tumor. Most meningiomas, metastatic lesions, and rapidly growing gliomas (grades 3 and 4) show positive scans. The least likely to show are slow-growing astrocytomas. Lesions of the posterior fossa are harder to show than those of other areas.

Illustrations 12 and 13 show a large area of abnormal increased uptake in the right posterior parietal area. The pathologic diagnosis was glioblastoma multiforme.

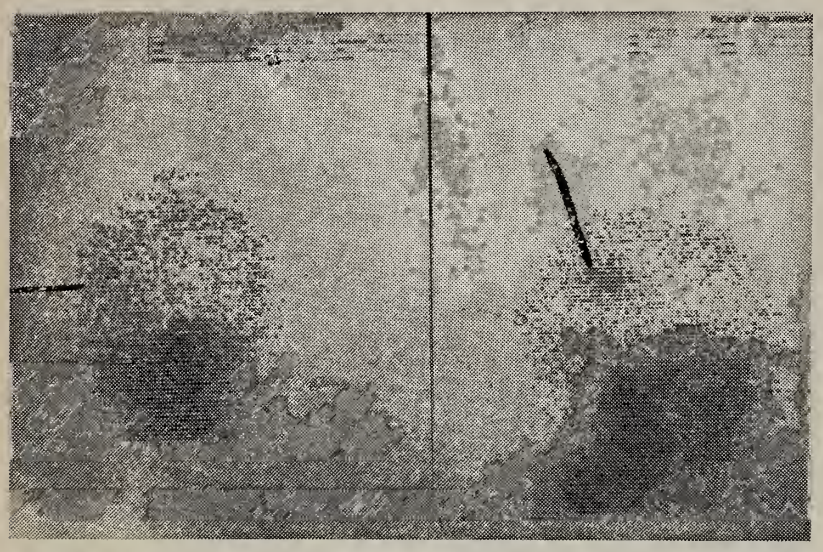


Figure ♯12 Brain Scan — Right Posterior Parietal Glioblastoma Multiforme.



Figure ♯13 Right Posterior Parietal Glioblastoma Multiforme, same case as ♯12.

Illustrations 14 and 15 show a posterior fossa lesion, cerebellar in location. The pathologic diagnosis was metastatic undifferentiated oat cell carcinoma, probably from lung.

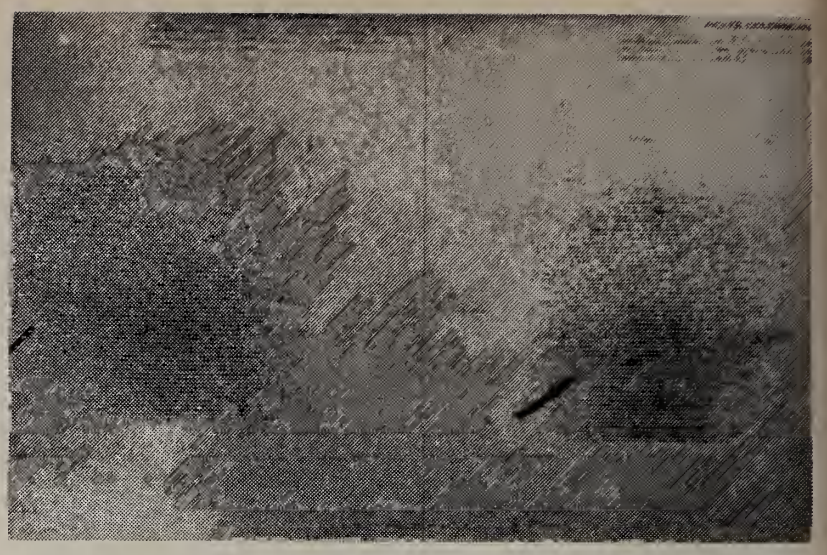


Figure ♯14 Brain Scan — Right Posterior Fossa Metastatic Oat Cell Carcinoma.

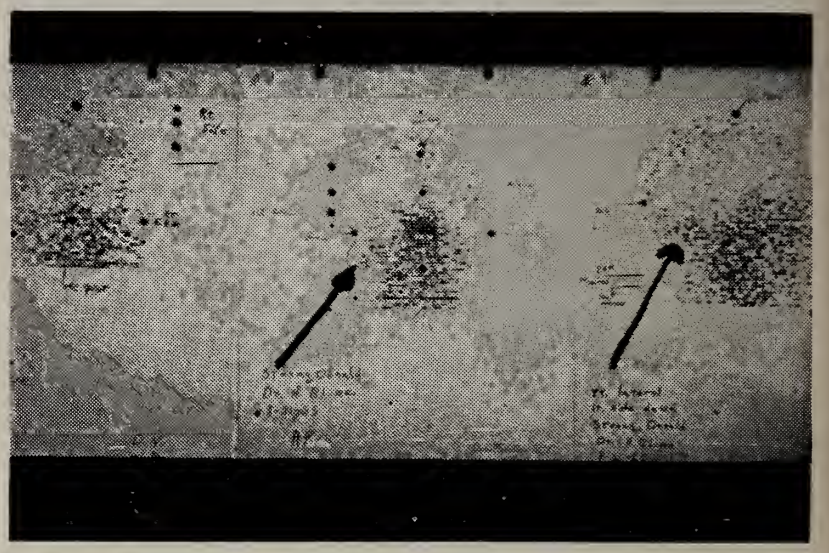


Figure ♯15 Right Posterior Fossa Metastatic Oat Cell Carcinoma, same case as ♯14.

Illustration 16 shows a metastatic tumor in the left posterior frontal and anterior parietal area. Illustrations 17 and 18 are of the same patient, and show increase in size of the tumor two months later.

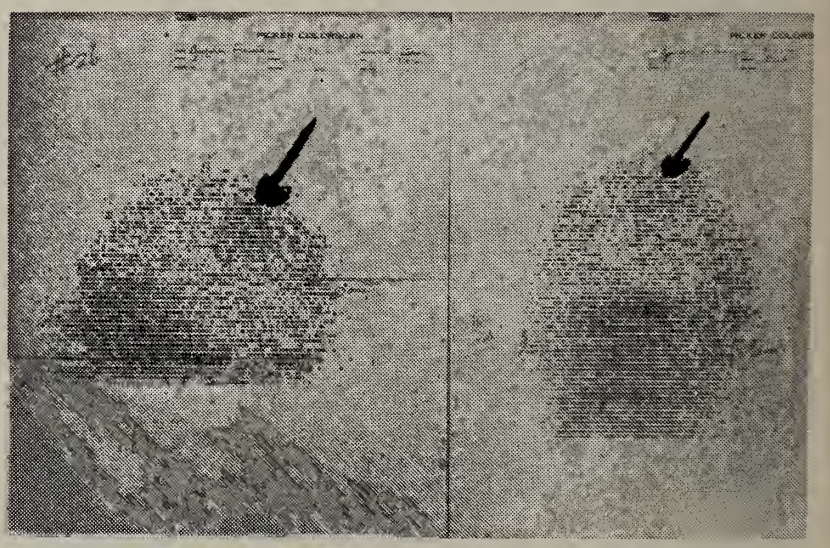


Figure ♯16 Brain Scan — Left Posterior Frontal, Anterior Parietal Metastatic Tumor.

Illustrations 19 and 20 show an astrocytoma, grade 3 in the left temporal region.

Illustrations 21 and 22 demonstrate a left sphenoid ridge tumor. The pathologic diagnosis was meningeal sarcoma.



Figure ♯17 Left Posterior Frontal, Anterior Parietal Metastatic Tumor, same case as ♯16 Two months later.

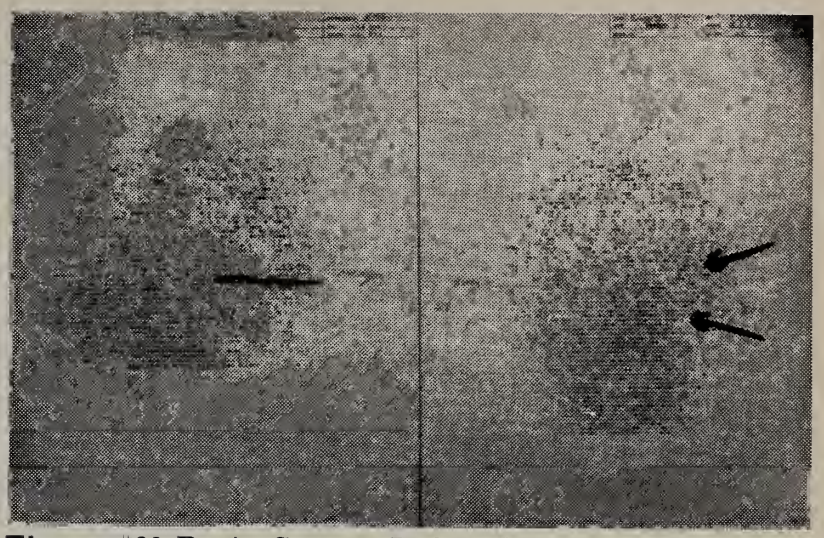


Figure ♯21 Brain Scan — Left Sphenoid Ridge Meningeal Sarcoma.

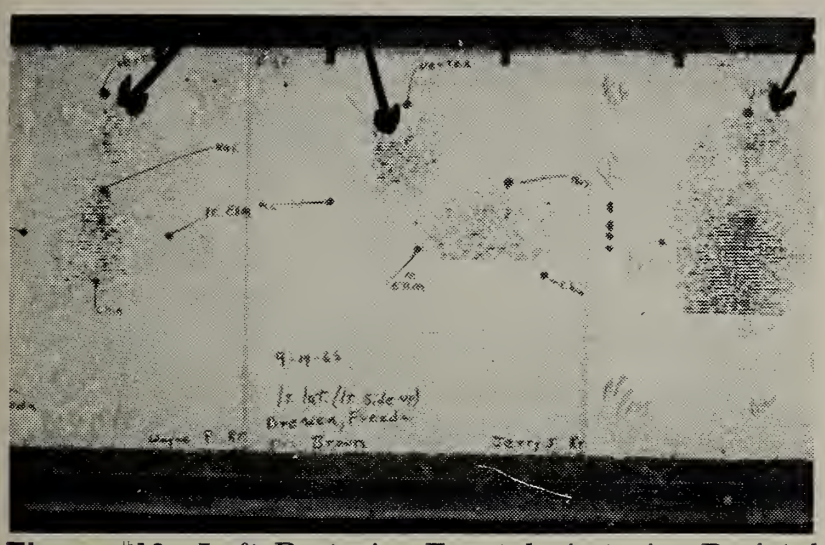
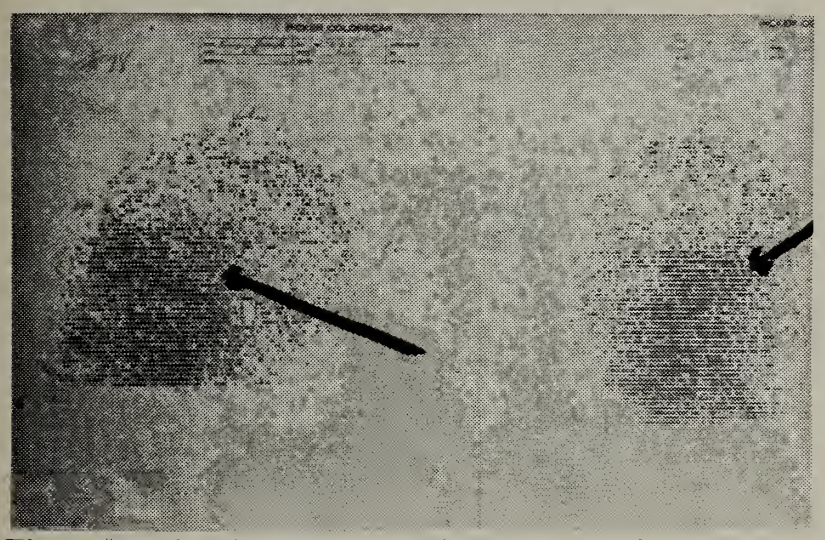


Figure ♯18 Left Posterior Frontal, Anterior Parietal Metastatic Tumor, same case as ♯16 and ♯17.



Figure ♯22 Left Sphenoid Ridge Meningeal Sarcoma, same case as ♯21.



Figure♯ 19 Brain Scan — Left Temporal Astrocytoma Grade 3.

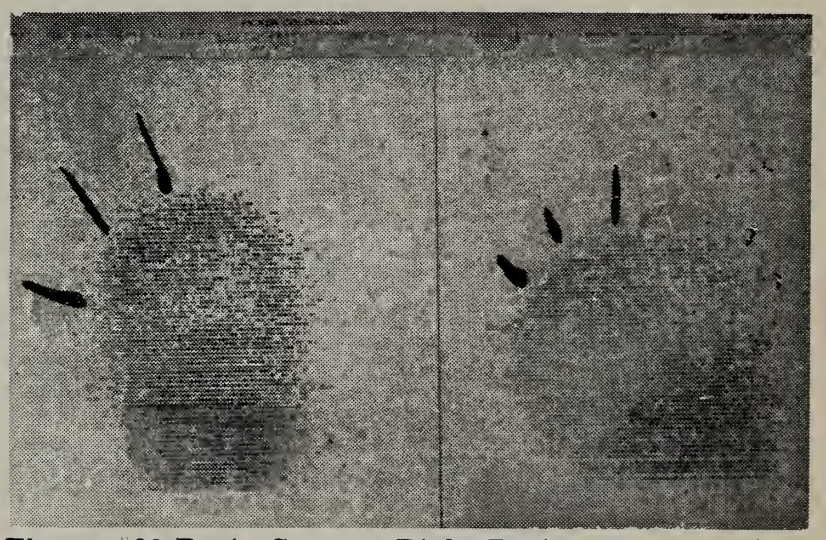


Figure ♯23 Brain Scan — Right Parietal Intracerebral Hematoma.



Figure ♯20 Left Temporal Astrocytoma Grade 3, same case as ♯19.

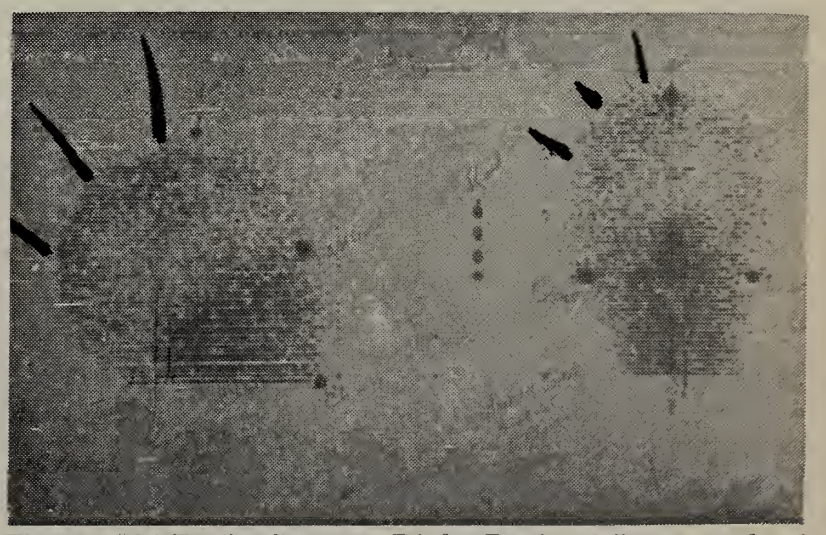


Figure ♯24 Brain Scan — Right Parietal Intracerebral Hematoma.

Illustrations 23 and 24 demonstrate a large diffuse area of increased uptake in the right mid-parietal area. This was not a neoplasm, but an intracerebral hematoma, surrounded by areas of edema.

The present study includes our first sixty brain scans. Thirty were considered normal, eight were considered probably normal, while twenty-two were abnormal. There were no proven false positives at the time of review. There were three cases where the brain scan was considered normal, but operation showed pathology. One was subdural hematoma; one was metastatic tumor, bilateral temporal; while one was astrocytoma, grade 1, cystic.

DISCUSSION

This must be considered a preliminary series, since insufficient time has elapsed to determine if some scans reported normal may later show pathology. However, our experience with brain scanning thus far seems to parallel closely that previously reported in literature. Brain scanning has proven to be in many cases a valuable screening procedure, and in other cases, to be helpful when used in combination with other procedures, including pneumo-encephalograms, ventriculograms, and cerebral angiograms.

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SALICYLISM AND ITS TREATMENT BY ALKALINIZATION AND INTERMITTENT PERITONEAL DIALYSIS*

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INTRODUCTION

Approximately 25% of all intoxications in children are attributable to ingestion of salicylates as aspirin or methylsalicylate (oil of Wintergreen). Toxicity frequently results from accidental ingestion but also from prescribed overdosage by parents and, at times by physicians. The usual safe dose of aspirin for children is as follows: 30 milligrams (gr. ss) for infants from 6-12 months of age every 6 hours for temperature above 101°F. Sponging, especially in infants under 6 months of age, shuld be resorted to for control of fever. The dosage for antipyresis and analgesia for children 1 year of age or older is 1 grain per year of age not to exceed gr. V q. 4 to 6 hours for temperature above 101°. Conditions such as rheumatoid arthritis require larger doses of aspirin. Serial determination of blood levels is useful when large doses are required to determine adequacy of dosage and to detect potential toxicity. Maintenance levels in the plasma of 20-25 mg% are desirable in such conditions.

Salicylates appear in the blood and urine within 15 minutes after ingestion. Peak levels are achieved in 2-4 hours, however, excretion takes place over a 48 hour period. Consequently, pyramiding of levels in body fluid occurs following repeated ingestions.

Salicylates in toxic doses produce a variety of disturbances. These include: (a) initial respiratory alkalosis due to hyperventilation from stimulation of the respiratory center and a reduction of PCO_2 (carbonic acid). This is soon followed by metabolic acidosis due to high levels of salicylic acid and accumulation of organic acids such as pyruvic, ketoglutaric and lactic. During the development of metabolic acid there is a mixed respiratory alkalosis and metabolic acidosis and the pH of the body fluid may therefore change from one above 7.45 (respiratory alkalosis) initially, to normal (7.4), and finally to one below 7.35 (metabolic acidosis) with progressive fall in CO_2 content or combining power; (b) body deficit of potassium occurs which may not be correlated with the level of this ion in plasma; (c) dehydration secondary to hyperventilation, vomiting, and osmotic diuresis parallels the degree and duration of the toxic state; (d) ketosis along with accumulation of acid metabolites mentioned above, results from disturbance in utilization of carbohydrate, (interference with various stages in Krebs tricarboxylic cycle) and decrease in caloric intake; (e) hypo and hyperglycemia; (f) hypermetabolic rate; (g) hyperpyrexia; (h) elevated glucocorticoid levels have been reported and explained on basis of competition for glucuronide by salicylates; (i) hypoprothrombinemia, for which Vitamin K is indicated.

Done[1] has demonstrated that blood levels of salicylate and toxicity from ingestion of a **single large dose** of salicylate are time related. However, blood levels after repeated administration do not necessarily correlate with the degree of toxicity. Appraisal of the clinical status and alteration in acid base balance are of key importance and dictate the need for treatment. Although levels of 70 mg% 2-4 hours following ingestion of a **single dose** may be regarded by some as being compatible with mild intoxication, in our experience, such levels usually are associated with laboratory evidence of derangement in acid base balance and clinical evidence of toxicity, indicating that energetic treatment is necessary. Plasma levels of 30 mg% or less following repeated ingestions have been associated with severe toxicity and even death.

TREATMENT OF INTOXICATION

Effective treatment embodies procedures which promote removal of salicylates from the

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* Presented at the Annual Meeting of the South Dakota State Medical Association, May 21-24, 1966, Huron, South Dakota.

body. Emesis is preferred over gastric lavage for removal of salicylate from the G-I tract and is most effectively accomplished by giving Syrup of Ipecac in doses 8-15 milliliters (one-half to one tablespoonful) within the first hour, if possible, following ingestion. This dose may be repeated if vomiting has not occurred in 20 minutes. Other methods of removal include (a) enhancement of urinary excretion through alkalinization, (b) intermittent peritoneal dialysis with the use of 5% albuminosol, (c) combination of alkalinization and peritoneal dialysis, (d) exchange transfusions—limited primarily to young infants, (e) extracorporeal hemodialysis, an effective method available primarily in medical centers. The remainder of this discussion will be limited to treatment by alkalinization, intermittent peritoneal dialysis, and a combination of these.

ALKALINIZATION:

Alkalinization is highly effective in promoting urinary excretion and is adequate in high percentages of cases. Treatment with sodium bicarbonate is to be excluded until metabolic acidosis develops and blood pH falls below 7.4. Thus, determination of pH is highly desirable if not essential, since base bicarbonate, as measured by CO_2 content or combining power, progressively falls from normal levels as the various stages of disturbance in acid-base balance progress from respiratory alkalosis to metabolic acidosis. We have used the methods of alkalinization recommended by Oliver and Dyer[2] and Whitten and Kesaree.[3] Although both methods enhance urinary excretion, the latter which involves the use of larger quantities of sodium bicarbonate more uniformly resulted in alkalinization of the urine and a greater excretion rate of salicylate. A readily available solution of 7.5% sodium bicarbonate solution (0.89 M) is injected intravenously and urine specimens collected for pH through an indwelling catheter are checked at 10-15 min. intervals. Patients whose weight does not exceed 10 Kg. initially receive up to 20 ml. (2ml/Kg) and larger children up to 40 ml. undiluted 7.5% sodium bicarbonate solution intravenously over a 5 to 10 minute period. Concomitantly, or immediately following the injection of sodium bicarbonate solution, a solution is infused intravenously at the rate of 500 ml/M^2 or 30 ml/Kg per hour until urine output has been observed, which is composed of one-third strength sodium chloride (50 mMol/L) with 5% dextrose to each liter of which is added 100 ml. of 7.5% sodium bicarbonate. If urine formation has not occurred in an hour a similar quantity of 5% dextrose in water is infused. By this time urine formation is generally demonstrable and 20 mEq of K+ a K Cl is added per liter of the above solution and infused at the rate recommended for moderately to severely dehydrated patients, i.e., 2400-3000 ml/M^2/24 hr.; or 140-180 ml/Kg/24 hr. Readily available Butler-Talbot solution to which 100 ml. of 7.5% sodium bicarbonate solution is added per liter may be used instead of the above mixture. If the urine pH has not exceeded 7.0 at the end of 15 minutes, one half of the initial dose of 7.5% solution of sodium bicarbonate (1.0 ml/Kg) is repeated. This dose is subsequently repeated at 15 minute intervals as long as the urine pH remains below 7.0. This regime should be continued until there is clinical improvement and the plasma salicylate levels reach 30 mg% or less. If possible, plasma sodium levels should be followed and levels above 155 mEq/L indicate that administration of the concentrated sodium bicarbonate solution should be temporarily discontinued or reduced.

Table I SALICYLATE REMOVAL
Mg/Kg/Hr. - Average Values

	Urine	Dialysis Fluid	Total	No. of Patients
Alkalinization	6.0	—	6.0	6
Intermittent Peritoneal Dialysis	0.4	7.3	7.7	7
Alkalinization Plus Peritoneal Dialysis	5.2	7.2	12.4	7

INTERMITTENT PERITONEAL DIALYSIS:

Intermittent peritoneal dialysis is a relatively simple method. Using this procedure and 5% albuminosol as the dialyzing fluid, we have observed it to be equally effective to alkalinization in removal of salicylate[4, 5] Table I. Albumin was selected as a desirable ingredient in the dialyzing fluid because it binds salicylate and results in greater removal than available electrolyte and glucose containing solutions.[5] We encountered no complications from this procedure and the two methods when combined were compatible. The combination of alkalinization and intermittent peritoneal dialysis resulted in removal of twice the quantity of salicylate as was removed by either method alone. This procedure may be carried out as follows:

After the bladder has been emptied and under aseptic conditions, a No. 16F Oschner trocar is inserted through a small midline incision of

(Continued on Page 43)

Path C A P sule

Submitted by the College of American Pathology in connection with the South Dakota Society of Pathologists.

PORPHYRINS, PORPHYRIAS AND PORPHYRINURIAS

INTRODUCTION

The porphyrins are a group of compounds of great biological significance in both animal and plant kingdoms. Hemoglobin, the cytochromes, Vitamin B_{12}, and chlorophyll are all porphyrin containing molecules and, interestingly, all are synthesized biosynthetically by the same pathway.

Porphyrins, which are composd of four pyrrole groups, differ from one another in the arrangement of double bonds, side chains, and the chelated metal associated with the molecule (iron, copper, zinc, cobalt, magnesium). Since in the PORPHYRIAS we are concerned with the compounds which are the precursors of porphyrin synthesis it will be helpful to summarize the biochemical metabolic pathways of porphyrin metabolism.

BIOSYNTHESIS

Porphyrins are synthesized in the body from succinic acid and glycine which form, after decarboxylation, DELTA - AMINO - LEVULINIC ACID (ALA). Two molecules of ALA are condensed to form PORPHOBILINOGEN (PBG) which is the precursor pyrrole of porphyrins. Condensation of PBG units form di- and tripyrrole units which are converted into uro- and coprophyrinogens, and finally into protoporphyrin and/or the oxidation products, uroporphyrins and coproporphyrins. These latter porphyrins occur as Type I and III isomers and differ primarily in the side chains on the pyrrole units.

PORPHYRIAS AND PORPHYRINURIAS

Normal adults excrete daily small amounts of coproporphyrins I and III and traces of uroporphyrins I and III in the urine and feces. In metabolic disturbances - either hereditary or acquired - these excretion products may increase markedly.

PORPHYRIAS (hereditary defects)

1. **Porphyria erythropoietica**

   This disease results from a deficiency of an enzyme necessary for the synthesis of heme in developing normoblasts of the bone marrow. Symptoms which occur in infancy include photosensitivity, increased hemolysis and erythropoiesis, splenomegaly, excessive porphyrin in the developing red blood cells of the bone marrow, red fluorescence of teeth and urine in ultraviolet light, and increased urinary excretion of porphyrins. Such urine upon standing may develop a red color.

2. **Porphyria hepatica**

   These familial disorders are characterized by excessive and abnormal formation of porphyrin precursors in the liver.

   a. **Intermittent acute type**

      This type is characterized by individual attacks of varying duration and varying

PORPHYRIN EXCRETION PRODUCTS

Condition	Urinary Excretions				Fecal Excretions	
	Copro	Uro	PBG	ALA	Copro	Uro
Normal (ug/24/hrs.)	60-280	10-40	0-2000	1300-7000	300-1400	20-50
Porphyrias						
Erythropoietic	+	+	N	N	+	+
Acute hepatic	N	N	+	+		
Cutanea tarda	+	+	N	N or +	+	+
Porphyrinurias						
Lead Poisoning	+	N or +	N	+	N	
Heavy Metal Poisoning	+				N	N
Chemicals	+				N	N
Alcoholism	+					
Anemias	N or +					
Hodgkins Disease	+					
Azotemia	—					
Hepatitis	+					
Hepatic cirrhosis	+	+				
Infectious mononucleosis	+					
Poliomyelitis	+				+	

N = Normal
\+ = Increased excretion
— = Decreased excretion

Copro = coproporphyrin
Uro = uroporphyrin
PBG = porphobilinogen
ALA = delta-aminolevulinic acid

periods of symptom-free remission. Severe abdominal pain and/or neurological symptoms (peripheral neuropathy, bulbar, psychic and autonomic manifestations) may occur during severe attacks. Porphobilinogen and delta-aminolevulinic acid appear in the urine. Sensitivity to light is not a symptom.

b. **Cutanea tarda type**
This porphyria is an intermittent syndrome characterized by sensitivity to light, particularly in the middle aged adult. Hepatic dysfunction is frequent; abdominal and nervous symptoms are not features of this disease. Porphobilinogen is not found in urine.

c. **Combined or Mixed**
In this form abdominal and nervous manifestations are similar to the acute type but long and complete remissions may occur.

PORPHYRINURIAS

A temporary increase in porphyrin excretion in the urine (porphyrinuria) may result from acute alcoholism, lead or heavy metal poisoning, prolonged and/or heavy exposure to certain drugs and chemicals (barbiturates, sulfonamides, benzene, carbon tetrachloride, chlorinated hydrocarbons), infectious hepatic diseases, diseases of the gastrointestinal tract, blood dyscrasias, and ionizing radiation.

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SERUM IRON and IRON BINDING CAPACITY

Approximately 70% of the body's iron is present in hemoglobin; 20% is in the form of storage iron; myoglobin accounts for 5%; 5% is present in the cellular respiratory enzymes; and 0.1% is carried in the plasma bound to one of the beta-globulins called siderophilin or transferrin. Normally the total iron binding capacity (TIBC) of serum is 300 to 360 micrograms (ug)/100 ml.[1] Normal serum contains 80 to 140 ug. iron/100 ml;[1] therefore serum is 30% to 40% saturated with iron. Although there is a fairly wide normal range of values, the values obtained at the same time of day in any single individual are fairly constant.

The clinical significance of these measurements of serum iron, serum iron binding capacity and % saturation is that they represent an equilibrium between supply, reserves and demands of iron and will reflect pathologic states more specifically than measurements of hemoglobin and erythrocyte mass alone. In a recent comparison of methods applied to iron deficiency, the measurements of serum iron and iron binding capacity were found to be more reliable than oral iron tolerance tests and radio-iron studies.[1] These determinations were surpassed in reliability only by examination of bone marrow aspirate stained for iron. Thus, the clinician who has the problem of decreased hemoglobin and decreased serum iron in a patient will be helped by the determination of the total iron binding capacity: an elevation of the iron binding capacity strongly supports a diagnosis of iron deficiency while a decrease suggests chronic infection, renal disease or cirrhosis.

The combination of anemia with elevated serum iron usually indicates impaired hemoglobin synthesis (as in pernicious anemia and hypoplastic anemias) or excessive hemolysis. In these conditions the iron binding capacity is decreased (See Table).

SERUM IRON AND IRON BINDING CAPACITY IN PATHOLOGIC STATES (average figures)

CONDITION	SERUM IRON	IRON BINDING CAPACITY
Normal	80-140 ug/ 100 ml.	300-360 ug/ 100 ml.
Iron Deficiency Anemia	decreased 25 ug	increased 450 ug
Anemia of Late Pregnancy	decreased 60 ug	increased 500 ug
Anemia of Azotemia	decreased 60 ug	decreased 250 ug
Anemia of Chronic Infection	decreased 25 ug	decreased 200 ug
Pernicious Anemia	increased	decreased
Untreated or Relapse	150 ug	250 ug
Treated	60 ug	250 ug
Hemolytic Anemias	increased 200 ug	decreased 250 ug
Hemochromatosis	increased 150 ug	decreased 200 ug
Erythremia	increased 160 ug	decreased 300 ug
Acute Hepatitis	increased 200 ug	increased 450 ug
Portal Cirrhosis and Chronic Biliary Obstruction as in Neoplasm	low normal 80 ug	decreased 250 ug

In addition to evaluating anemia, the determination of serum iron and iron binding capacity are helpful in evaluating abnormal liver function. In the presence of hepatomegaly or jaundice the finding of a high serum iron combined with increased iron binding capacity suggests acute hepatitis while more chronic conditions such as portal cirrhosis, post-hepatitic cirrhosis, and chronic biliary obstruction (as in neoplasm) are characterized by normal or low serum iron and decreased iron binding capacity. Erythremia and hemochromatosis are suggested by high serum iron and low iron binding capacity.

In all cases serial determinations are more valuable for both diagnosis and prognosis than a single test. It must be remembered that the iron content of serum is subject to diurnal variation. Values in the morning may be 10-30% higher than those observed in the late afternoon. Serial determinations on any one individual should therefore be done at the same time of day. Serum iron values for women are about 10-15% lower than for men.

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(Continued from Page 40)

the skin at a point midway between the umbilicus and symphysis pubis; with the stylet in place, the trocar is forced through the abdominal wall into the peritoneal cavity. The stylet is then removed and a multiperforated tube is threaded through the trocar and directed into the pelvic gutter. The trocar is then removed and the tube fixed with mattress sutures prior to careful bandaging. Serrated multiperforated plastic tubes especially prepared for peritoneal dialysis are available through firms which supply parenteral fluids. Fifty to eighty milliliters of albuminosol* per kilogram may be instilled without interfering with respiration and should remain in the peritoneal cavity for 3 hours for equilibration before removing by gravity in a closed sterile system with the assistance of abdominal manipulation. The procedure is repeated three times over approximately a 10 hour period. On the average, 80% of the instilled fluid was removed by us.

Table I summarizes our results in children with salicylism treated by (a) alkalinization and parenteral fluid, (b) intermittent peritoneal dialysis and parenteral fluid without alkalinization, and (c) a combination of alkalinization and intermittent peritoneal dialysis.

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SUMMARY

(a) Alkalization of the urine by administration of sodium bicarbonate, is effective in increasing renal salicylate clearance. This method is practical and may be safely employed if due caution is used, particularly concerning the adequacy of renal function.

(b) Intermittent peritoneal dialysis without alkalinization results in removal of quantities of salicylate comparable to alkalinization.

(c) The combination of intermittent peritoneal dialysis with fluid and alkali therapy increases significantly the rate of salicylate removal over that observed when fluid and alkali are used without dialysis.

(d) While use of intravenous fluids with alkali appears to be the treatment of choice in most cases of salicylism in infants and young children, the concomitant use of intermittent peritoneal dialysis with its universal availability, simplicity, and safety is highly advantageous when more rapid removal of salicylate is indicated.

(e) Vitamin K parenterally is recommended for combating hypoprothrombinemia.

* Albuminisol was supplied by Merck Sharp & Dohme, Division of Merck and Company, Inc., West Point, Pa. The electrolyte content of the diluent is as follows: Na+, 142.0 mEq./L.; Ca++, 0.6 mEq./L.; Cl-, 130.0 mEq./L.; "Carbon dioxide", 4.6 mEq./L.; Acetyltryptophane, 4.0 mM./L.; Caprylate, 4.0 mM./L. Subsequent to our study the above formula has been somewhat modified.

Editorial— SOUTH DAKOTA PROVIDES THE STIMULUS

Prior to the June, 1966, House of Delegates meeting of the American Medical Association, a problem was presented to the Council of the South Dakota State Medical Association by the Pierre District Medical Society. The problem revolved around a statement of bulletin number 37, December 1964, published by the Joint Commission on Accreditation of Hospitals which required that an applicant for emergency room treatment be seen by a physician within fifteen minutes after the patient's arrival at the emergency room.

The Council reviewed this situation and instructed your AMA delegate and alternate delegate to present a resolution to the AMA House of Delegates asking that this policy be amended based on the fact that, in South Dakota and in many other states, it is impossible for a physician to arrive at an emergency room within the fifteen minute requirement. The resolution was drawn asking that present policy be deleted and that substitute wording be inserted. The suggesting wording in your resolution read as follows: "Medical staff coverage should be adequate to insure that applicant for treatment will be seen by a physician within a reasonable length of time relating to the disease or injury that exists."

The resolution was adopted by the AMA House of Delegates and forwarded to JCAH. Your executive office has been informed that JCAH has amended the statement and adopted the wording which was submitted by the South Dakota delegation. JCAH Bulletin No. 42 carries this amendment.

Credit must be given to Arthur P. Reding, M.D. and Robert H. Quinn, M.D., your AMA delegate and alternate delegate for the work they did in accomplishing this change in JCAH policy.

A FLORIDA M.D. VIEWS TITLE 19

A Tampa, Fla., internist recently compared Title 19, one of the vast new government health care programs established by Public Law 89-97, to Topsy coming of age.

Title 19 is an expansion of earlier Kerr-Mills legislation that offers federal aid to the states in setting up programs designed to bring needed medical care to all citizens deemed "medically indigent."

"Topsy is a big girl now," H. Phillip Hampton, M.D., said at the Annual Program Conference of the National Association of Blue Shield Plans at the Drake Hotel, Chicago.

Dr. Hampton, a member of the American Medical Association's Committee on Welfare Services, explained: "Through Title 19, her guardians are able to provide a place for her in the regular channels of medical care by adequately compensating the vendors of services, and the medical profession can provide medical services in a more organized manner."

Dr. Hampton applauded implementation of Title 19 programs through the Medicare carriers like Blue Shield and intermediaries like Blue Cross as "a convenient and logical method of accomplishing the objective of adequate tax supported health care for those in financial need."

Calling attention to the fact that "insuring the poor is a familiar role for Blue Shield," Dr. Hampton said, "participating physicians have provided services for charges within the premium allowances."

He cautioned that "a democracy cannot provide personal services efficiently or economically and must contract with the private sector for medical and other personal services government is obligated to provide."

Dr. Hampton added that inadequate implementation of Title 19 could inevitably lead to extension of Medicare which would "produce a system of institutional medical care that has been proven repeatedly to be a high cost, low production method of providing health services and, in my opinion, would be a catastrophe for quality medical care and the Social Security taxpayer."

There are dangers in Title 19, he noted, including abuses that lead to excessive expenditures.

"Political abuse of increasing eligibility for tax supported medical care to unrealistic levels can be controlled by legislation," he said. "But abuse by the vendor and recipient cannot be readily controlled by legislation or restrictive governmental regulations."

Cooperation by the practicing physician is essential to effective utilization control, Dr. Hampton said.

The National Association of Blue Shield Plans is the national coordinating organization for the 85 member Blue Shield Plans that provide medical and surgical care benefits to 58 million persons in the United States, Canada, Puerto Rico, and Jamaica.

MEDIC ALERT SAVES LIVES

Ten years ago, a California physician whose daughter almost died as a result of a reaction to a skin test for tetanus antitoxin, founded the Medic Alert Foundation International. Today more than 160,000 people wear the nonprofit Foundation's increasingly familiar stainless steel emblems on the wrist or around the neck, each calling immediate attention to one or more of 200 hidden medical problems. When necessary, by a collect telephone call to the Foundation's Turlock, Calif., headquarters, physicians and other authorized personnel may obtain additional medical information that may save the life of a conscious or unconscious person wearing a Medic Alert emblem. The telephone number appears on all emblems.

Each emblem carries the words "Medic Alert" and the staff of Aesculapius emblazoned in red enamel. The reverse side of the emblem contains one or more key words, the Foundation's telephone number and the wearer's identifying number corresponding to an information card in the Medic Alert files. Thus in an emergency, physicians or others, at any hour of the day or night, can call the Foundation's Central Answering File and obtain further medical facts plus the wearer's name and address, his next of kin and the name of his family or personal physician.

The American Medical Association estimates that 40 million Americans — one in five — should be wearing a medical signaling device.

The one-time cost of a Medic Alert emblem and a round-the-clock information service is $5.00 (sterling silver emblems are $7.50). However, the Foundation provides memberships without cost for persons whose physicians state they are unable to pay.

Policies in this nonprofit foundation are established by a Board of Directors assisted by a Medical Advisory Committee. Further information may be obtained by writing to the Medic Alert Foundation, Turlock, California 95380.

ONE YEAR LATER — AN M.D. LOOKS AT MEDICARE

The principle of using nongovernmental insurers to administer the supplementary medical insurance, or Part B portion of Medicare, is not only embodied in the law but firmly favored by physicians and the Administration, a medical leader stated in Chicago recently.

Speaking before 500 executives and board members of the 85 Blue Shield Plans, Samuel R. Sherman, M.D., of San Francisco, a member of the top advisory committee to the Administration on Medicare — Health Insurance Benefits Advisory Council — said:

"The Blue Shield Plans that have been selected for this purpose have broad experience in processing claims and in dealing with physicians and medical societies that should enable them to administer the medical insurance program successfully."

Dr. Sherman pointed out, however, that Blue Shield must recognize that it faces "a challenge in demonstrating not only to physicians but to the beneficiaries of the program, the Congress and the general public that their performance merits the support of all."

The vigor and resourcefulness with which Blue Shield addresses itself to this task will be governed in no small way by the extent to which it shows that it is "responsive and responsible to consumer concerns and to considerations of public convenience and public need," he said.

Speaking of the review mechanisms in the administration of Medicare, Dr. Sherman, who is also a member of the American Medical Association's Council on Legislative Activities, said that physicians have as large a stake in assuring the proper determination of reasonable charges as the Government, the carriers and the public.

He encouraged Blue Shield Plans to work with physicians as they will be able to give sound advice in refining claims procedures that will be fair to both the Government and the aged subscribers who must meet the cost of the program.

Dr. Sherman also went on to say that, in his opinion, service by a physician on Medicare review committees is a professional duty of the physician, and no reimbursement from the Government should be sought or accepted.

"Physicians, not the Government or insurance organizations, have the responsibility to assure the proper utilization of hospitals in which they practice and the proper and ethical practice of medicine," he said. "This is a responsibility that cannot properly be shifted and which should not have to be subsidized."

In connection with the setting of fees, Dr. Sherman said that doctors as a group have never had any intention of taking advantage of the Medicare program by charging excessive fees to aged patients.

Many of the publicized stories of fee increases probably grew out of situations in which the physician had been charging aged patients less than his customary charge because of their limited means.

"The adjustment of such substandard fees in recognition of the fact that the program provides these aged patients the means to pay physicians' regular fees is justified and reasonable, as has been recognized by the Social Security Administration," he said.

The National Association of Blue Shield Plans is the national coordinating organization for the 85 member Blue Shield Plans that provide medical and surgical care benefits to 58 million persons in the United States, Canada, Puerto Rico, and Jamaica.

How's Your PRQ, Doctor?

PRQ stands for "Patient Relations Quotient."

Surveys show that the public's opinion of physicians is not as high as it once was. There are areas that both patients and physicians can work on to improve the time-honored physician-patient relationship. Patients could have more regard for the doctor's time and problems. Doctors could show more regard for the patient — and that's where **PRQ** comes in.

Here is a simple test that will help you determine how you handle 10 sensitive areas in the physician-patient relationship:

	True	False
1. My patients usually consider me a friend and confidant, as well as the technician who cures their ills.	____	____
2. I always give my patients time to talk to me about their ills; I listen attentively, and I take the time to explain diagnosis and therapy in terms they can understand.	____	____
3. I take the time to explain tactfully when I am unable to make a house call.	____	____
4. I am concerned about my patients' problems in paying for health care; I usually have a frank discussion of fees; I have a fee plaque (available from the AMA) on my wall inviting discussion.	____	____
5. I always itemize my bills so that my patients will know exactly what the charges are; I try to work tactfully with my patients to help them catch up on unpaid bills.	____	____
6. I train my office staff to schedule appointments so that I do not keep patients waiting more than a few minutes past the appointed time.	____	____
7. My reception room is bright and cheery, with up-to-date magazines; a rack of health education pamphlets (available from the AMA); comfortable chairs, furniture and equipment; good lighting.	____	____
8. My receptionist is neat, cheerful, friendly; she handles telephone calls with a pleasant voice and interested manner; she greets patients graciously and explains to them the reason for my delay in keeping their appointment, if a delay is unavoidable.	____	____
9. I often meet my patients outside the office, through my participation in civic affairs, such as serving on the school board, joining a service club, working with the chamber of commerce, and generally conducting myself as a good citizen as well as a physician.	____	____
10. I keep abreast of new developments in medicine in my community by regular participation in the affairs of my county medical society, thus enabling me to give better care to my patients.	____	____

If you answered "true" to all 10, you're practically a saint. If you answered "true" to 7, your score is good, but could stand improvement. If you answered "true" to 5 to 7, you would be wise to improve your manners. Your patients may respect your skills but probably don't think much of you as an individual. If you answered "true" to less than three, you'd better look out in your waiting room — it may be empty!

DEADWOOD DOCTOR

By F. S. Howe, M.D.

CHAPTER VI

Some Famous Characters

$4 came between me and fame. Calamity Jane took sick at the town of Terry, 7 miles from Deadwood. I was called to see her, but little knowing at the time that she was later to become nationally and internationally known, I thought of the livery bill — $4.00 for each trip to Terry. At that time it looked like a lot of money. Beside that, I had an obstetric case pending, so this was one of the few calls I ever turned down.

Another doctor was called after I had told them it was impossible for me to make the trip. Calamity had almost reached the end of the trail. She lived only a few days, dying of pneumonia in the Shannon Hotel in Terry.

Poker Alice who lived in Sturgis, South Dakota, about 14 miles from Deadwood was seen by me in consultation with a Sturgis physician. I made about 3 trips to Sturgis to see her. She was suffering from a severe gall bladder attack. She was no phony. She was a real Western character. She had a long rambling one story house in which you entered the dining room, the next room being the living room, and the third the bedroom. Poker Alice was in bed very ill when I first saw her. As the Sturgis physician and I were examining her, a man of all work entered Poker Alice's bedroom without knocking. I shall never forget her comment. She said, "Charlie, a gentleman does not enter a lady's room without knocking. Get out!" Charlie got.

About the second or third trip which I made to see Poker Alice, she asked me about an operation. I told her that in my judgment she was in no condition to stand an operation. She said, "So what," and insisted upon being operated upon. I told her that our surgical death rate meant a great deal to us and frankly I did not care to operate on her as I felt that she would not survive. I did not see her again but read in the paper a few days later that she had passed away in another hospital where a surgeon braver than myself operated on her and promptly lost her.

One of my patients that I operated upon was the well-known Dr. F. E. Townsend of the Townsend Plan fame. Dr. F. E. Townsend was located at the town of Nisland, about 30 miles from Deadwood during and for some little time after World War I. At that time I was called to Nisland to consult with Dr. Townsend frequently and did most of his surgical work. Dr. Townsend became ill and came to the hospital in Deadwood where he called me. After examining him, I asked him for a consultation and called a Deadwood physician who agreed with me that an immediate operation was necessary. I made a diagnosis of intestinal obstruction and operated upon him. I had very slight hope of his recovery. He got along fine and later went to California where he became nationally known and is still active in spite of all his adhesions.

Deadwood Dick, as most people know, was more or less of a fictitious character whom I attended during his last illness. The man who was best known as Deadwood Dick was Dick Clark. He was a real showman and made a trip to Washington by plane to invite President Coolidge to come to the Black Hills for his summer vacation in the spring of 1927. The quest was evidently successful as Coolidge spent the entire summer in the Black Hills. Deadwood Dick died in St. Joseph's Hospital at Deadwood and was buried at the top of the highest mountain overlooking his cabin in Pinecrest Park.

I knew Anse Tippey, the bartender who was on duty in Saloon No. 10 when Wild Bill was killed. He had a fine family. I took care of the family and attended Anse Tippey in his last illness.

Another well-known character that I attended in his last illness, many years later, was Potato Creek Johnny. Potato Creek Johnny was a real prospector and discovered the largest gold nugget that has ever been found in the Black Hills. He was less than 5 feet tall, wore long hair and a long black beard. During his later years, he spent his summers in Deadwood. He was constantly followed around by crowds of children. He was always kind to them and was a never ending source of delight to the children as well as some of the elders.

A memorial ceremony on the anniversary of the death of Preacher Smith, pioneer Methodist preacher in the Black Hills, has become an annual event. This was held at the site of his monument, some $3\frac{1}{2}$ miles west of Deadwood on Highway 85. At one time I was appointed a committee of one to secure a speaker. I inquired whether I would have any limitation on my choice and was told that I would not. For the first time in the history of this annual event, I asked John T. Heffron, a devout Catholic, to give the dedicatory address. The event was held

at the monument on the first Sunday in August. There was usually a fair size crowd present and most of the audience found it necessary to stand during the ceremony. John T. Heffron, who was, in my opinion, one of the finest orators in the State of South Dakota and a most colorful character, was born and reared in Deadwood; he made, what I consider, the finest address which had ever been made on this occasion. Before the ceremony there was some criticism because of the fact that I had selected a Catholic to give the address in memory of this Methodist preacher, but after hearing this address, all were in accord that it was the finest address which had ever been given on this occasion.

Mr. Heffron was perhaps the best criminal lawyer in the State of South Dakota, colorful and gifted with the most wonderful deep voice and remarkable dramatic ability. As an orator, he had few equals.

When I took office as Mayor in 1924, I appointed John T. Heffron as my City Attorney.

He later defended George Sitts, a desperado from Minnesota. George Sitts, to my personal knowledge, killed three men. The first in Minneapolis where he held up a bartender. He told me that for some reason which he did not understand the bartender attempted to get a gun which was some 15 or 20 feet away. He said, "It was him or me, and I killed him." He escaped jail in Minneapolis and drove to the Black Hills, coming in on Highway 212, where he stopped at a ranch near Sulphur, South Dakota, finding no one at home. He found two guns, one of which after trying out he thought was entirely satisfactory. He also found food and among other things a fruit cake. It so happened that the ranch where he stole the fruit cake and guns belonged to a patient of mine, a school teacher. When I was taking care of George Sitts, for frozen feet, I asked him how the fruit cake was. He said, "Fine."

Two officers stationed themselves at the fork of the road and attempted to stop him, having been warned that a dangerous criminal was in the vicinity. He killed both of these officers before they could even draw a gun. He then drove some distance. When his car stalled, he proceeded on foot and hid in a school house which had not been used for several years. He told me that while hiding up in the loft of the school house, the amateur sleuths occupied the lower portion, the first floor of the school and looked all over for him. He could, of course, hear all the conversation. He said that if one of them had stuck his head through the opening to the loft, he would, of course, have blown his head off.

The weather was extremely cold and after occupying the school house for a time, he had to find food. He made his way to Deadwood at night and managed to get into a basement where there was plenty of canned fruit and also water. He stayed there for almost a week. He came uptown and seeing a boy sitting in a parked car, slid in the back seat and told the boy to drive. The boy drove, going out on Highway 85 and 14 into Wyoming. After he had gone some distance into Wyoming, Sitts asked the boy to leave the car and gave him $10 to buy food or whatever necessities he needed until he could get help. He took over the car, then went further into Wyoming where he was captured and brought back to Deadwood. His feet were badly frozen and for some time I thought that it was very doubtful if we could save all of his toes, thinking it might be necessary to amputate some of them. However, we managed to save his toes.

One time while I was dressing Sitts' feet, there was another prisoner standing by and he showed me a rash which he had and about which he wished to consult me. I told him that it was an allergy. George immediately spoke up and said, "Do you know what he is allergic to?" When I asked him what he was allergic to, George said, "Confinement."

I asked him why he turned the boy who owned the car loose. He said, "I always get softhearted. He had been nice to me and I just couldn't kill him." John T. Heffron was appointed by the court to defend Sitts. The fee allowed by the State was, I think, $75.00, but Mr. Heffron told me, "When the court requests me to do something, I do it." He made one of the most eloquent pleas that has ever been made in the Lawrence County Court Room when he made his plea to the jury. It was, of course, all to no avail. The jury found George Sitts guilty. He appealed the case to the Supreme Court but failed to get a reversal. After the trial, George Sitts wrote John Heffron a letter telling him that nobody could have done more than he had but he said, "I gambled and lost; therefore must pay the penalty." Sitts was sentenced to death and was later electrocuted at the penitentiary in Sioux Falls. Mr. Heffron's sense of duty to his profession was such that he fought to the last ditch to save this man who had deliberately killed three men.

I well remember after I had made a careful examination, including electro-cardiograms of Mr. Heffron, sitting down and in great detail telling him that he had his choice of either living for probably many years if he absolutely discontinued active court procedure limiting himself to office law, regulating all of his activities and entirely changing his mode of life. The other choice was that if he continued actively at work as he had, he would not have long to live. Just as soon as I had given him this verdict, he said, "I prefer to go on as I have and when my time comes, I shall be ready." He was.

Another colorful character was the late Dick Costello who, for 11 years, was Chief of Police during my administration. Dick Costello never wore a uniform, never carried a club and very seldom carried a gun. He was absolutely fearless. He would arrest a dangerous man without a gun or weapon of any kind, but if the man made one move, he wondered what had hit him. Many, many times tough boys came from other towns to clean up on Dick Costello. The battle was always one of fists and I have never known Dick to come out second best.

There was a man who came here who got a job as a barber in one of the shops. At the house where he roomed, he became very chummy with the boys and took them out to teach them shooting. He was an expert shot. Every Sunday he would take these boys out and teach them marksmanship. Mr. Costello watched for some time and decided he was a man who had escaped from the penitentiary in Oregon. He had been sentenced for life for murder. Mr. Costello walked into the shop one day and said, "Would you come along with me please." He said he would just as soon as he got his coat. Mr. Costello said, "Never mind your coat. Just come as you are without your coat." Of course, in his coat was undoubtedly a gun. The Oregon authorities were notified and he was sent back to the penitentiary.

Some of the largest newspapers in the country had been in the habit of sending their special correspondents to the Black Hills each year. They were supposed to write up the stories of the Black Hills in their various metropolitan papers. At one time the correspondents were to be brought from Rapid City to Deadwood by car, cars being furnished by citizens from Deadwood. Mr. Costello drove my car, and they were to be ready by 9 a.m. He was in front of the hotel promptly at 9, but the correspondents failed to show up. Finally about 11, after he had waited two hours or more, the correspondents came leisurely out and got in the car. Mr. Costello decided to get them to Deadwood as quickly as possible. He gave them a ride that had them grasping the seats and wondering whether they were ever going to get to Deadwood alive. When they got to Sturgis, they sighted Bear Butte Mountain. Thinking that it might distract his attention and slow him up somewhat, one of them asked, "What is the name of that mountain?" Mr. Costello said, "I wouldn't know. It wasn't there when I came down."

After retiring from the Police Force, Mr. Costello owned and operated a service station. I well remember the nice old couple, retired farmers from Iowa, who were sight seeing and asked Mr. Costello what they should see. He told them the various places of interest but told them especially about Mount Moriah Cemetery where Wild Bill and Calamity Jane were buried. They made the trip up there and after returning, the wife was having great trouble breathing, not being used to the altitude and also having put on a rather goodly amount of weight. She said, "Mr. Costello, there must be a great many people die of heart trouble here." He said, "No they do not. This is a very healthy country. Why, do you know how that cemetery was started?" She said, "No." He said that when Deadwood was founded, they thought it necessary to lay out a cemetery. This was done and it was discovered that a cemetery without any occupancy was not a cemetery. They, therefore, waited and waited for somebody to die but the climate was so fine that nobody died. This was finally solved by going out and killing a man and burying him in the cemetery. Thus the cemetery became a cemetery.

I remember a car from Illinois came by and stopped. A buxom lady in shorts jumped out of the car and said, "Mr., where is Wild Bill?" Dick Costello without a smile said, "Lady, I don't know where he is today. He was up in Mount Moriah Cemetery yesterday, but I haven't seen him today."

Another time a tourist car came by and stopped and one of the occupants said, "Is this Deadwood?" Mr. Costello said, "No, lady, this is not Deadwood. This is Presidential Heights. Just keep going up the street and in 3 or 4 blocks you will come to Deadwood." I have personally seen many, many times, people with foreign licenses come in and speak to Dick very friendly and fill up with gas and get all fixed

up. I would later ask him how he got to know that fellow. "Oh," he would say, "That's a fellow I sent to the pen when I was an officer out in Wyoming." It seemed to me that every person that he had ever sent to the pen came back to visit with him. I never could understand just why it was. He carried but one kind of gas. He never found it necessary to carry Ethyl gasoline. If anyone asked for Ethyl, he said, "My gas is a higher octane than the other fellow's Ethyl." Or if they were very insistent, he would ask them to drive right on to the next pump where they got the same gas as in the first pump.

Another one of the colorful characters who was a member of my administration was the late Charles Keene. He was appointed Street Commissioner by me, an office which he held until the time of his death. During and before the Days of '76 celebration, it was customary for many of the men about town to grow beards. It made some of the mildest men in town look like outlaws. The city had a rock crusher on Highway 85, just west of Deadwood, and this highway carried considerable tourist traffic. When a blast was about to be discharged, it was necessary to guard the highway to protect cars going by. Charlie Keene flagged one direction and another employee, who also had whiskers and looked equally tough, guarded the other direction. A tourist took one look at him, stepped on the gas and went right through both flagmen, thinking that they were being held up by outlaws. So far as I know, they never did find out that these men were anything but the worst kind of outlaws trying to hold up their car.

During one of our numerous campaigns in which I was running for re-election, a local artist drew a picture of the rock crusher and Charlie Keene standing by watching it. This picture was placed in the window of one of the local stores and attracted a great deal of attention. I am certain that it made votes for me instead of hurting me. Everybody loved Charlie Keene.

Jack Hoxie, the Gene Autrey of his day, came to Deadwood during my first term as Mayor, I think 1925, to make a picture. He was at the time with Universal. The picture was to be made at Jubilee City up Poorman Gulch. This log cabin town was built by the Homestake Mining Company to celebrate the 50th anniversary of the finding of the Homestake Mine. It became my duty as Mayor of the city to welcome the first movie people who ever came to Deadwood; in fact, the first who came to the Black Hills to make a picture. I had a special key made which was very large and I well remember my presenting it to Jack Hoxie on the street near the City Hall.

The picture, according to my recollection, proved to be somewhat of a flop. After Jack Hoxie and his company left Deadwood, we wondered whether it was a good idea to have given them the key. He had a beautiful solid silver saddle and bridle which he pledged to the Franklin Hotel for room rent. It was later sold at sheriff's sale. I have often since regretted that I did not make a bid on this saddle and bridle.

My next experience with the movie people was when Ken Maynard came with his company. He was already well known and later became much better known. He made a picture featuring a prairie fire, stage coach hold-up and altogether I believe this picture was well received.

(To be Continued)

GENERAL PRACTITIONER NEEDED

The Homestake Mining Company has openings for one or two generalists to practice with seven man G. P. group in company owned, fully accredited hospital, serving 1,930 employees and their dependents. Offices and all equipment furnished. Minimum salary is $15,000 with considerable increase for two or more previous years of practice. Excellent fringe benefits. Exceptional outdoor recreational area in the Black Hills of South Dakota, with adequate time off to enjoy it.

This is the largest gold mine in the Americas and has been in operation since 1878.

Lead is an attractive community of 6,500 with fine schools, stores and many churches.

If interested, write or phone John Moodie, Personnel Director or A. M. Semones, M.D., Chief Surgeon, Homestake Mining Company, Lead, South Dakota.

REPORT ON AAGP ACTIONS

Final physician registration for the American Academy of General Practice Session in Boston was 2,126. South Dakota was well represented by **E. T. Lietzke, M.D.** of Beresford, and **A. P. Reding, M.D.** of Marion.

Newly elected officers of the AAGP include: George E. Burket, Jr., M.D. of Kingman, Kansas — President-elect; Maynard Shapiro, M.D., of Chicago, Illinois — Vice President; John C. Ely, M.D., Spokane, Washington — re-elected to the post of Speaker of the Congress of Delegates; and William J. Hagood, Jr., M.D. of Clover, Virginia—re-elected as Vice-Speaker.

After considerable debate, the Congress adopted a Board Report which instructs the standing Committee on Constitution and By-Laws to prepare for submission at the Dallas meeting a proposed amendment which would change the Academy's name to the "American Academy of Family Physicians." Delegates were urged to poll their chapter membership and be prepared to vote on this proposal at the next annual session.

A step toward establishing a new specialty of family medicine was taken in adopting the "Core Content of Family Medicine" prepared by the Committee on Requirements for Certification. In a separate, yet related action, delegates also authorized resubmission of a preliminary application for establishing a board in family practice.

A preliminary application for a certifying board was filed last February with Liaison Committee of the Advisory Board for Medical Specialties. After filing, the Academy was requested by Committee to withdraw the application until reports of the Millis Commission and the AMA Ad Hoc Committee on Education for Family Practice were released.

In accordance with this request, the Academy's Board of Directors withdrew its preliminary application and it will be resubmitted in the near future. Meanwhile the Committee on Requirements for Certification, created by joint action of the Section on General Practice of the American Medical Association and the Academy under the chairmanship of Dr. Carroll L. Witten, developed a definition of the core content of family medicine. This committee's report was approved by the Congress and was published in the November **GP.** This study, "The Core Content of Family Medicine," will form the basis for the Academy's final application for a certifying board.

The Congress of Delegates urged the Board of Directors to continue vigorous opposition to dual fees for prepayment or governmental plans or "any form of payment for professional service based on any criteria other than that of usual, reasonable and customary fee for services rendered, regardless of the type of practice in which the physician is engaged who provides such service." This policy was affirmed in adopting Resolution No. 23 and Supplementary Report CC-7 of the Board. Delegates further instructed the Board of Directors "to see that the intent of this resolution is introduced at the next House of Delegates of the AMA."

The By-Laws were amended by the delegates to move the effective date for the more rigid active membership requirements to January 1, 1968. Though in agreement with the Reference Committee on Constitution and By-Laws that there is currently a lack of adequate graduate training programs to produce eligible candidates for Academy membership, delegates rejected a proposal which would have resulted in lowering the Academy's membership eligibility requirements.

A By-Laws amendment was adopted which authorized the Board of Directors to fix annual dues "not to exceed $35.00 per year." The Reference Committee on Constitution and By-Laws recommended adoption of the above substitute amendment rather than the flat $10.00 increase proposed earlier by the Board of Directors and Finance Committee.

A new statement of "Continuation Study Requirements" prepared by the Commission on Education and presented as a part of their annual report was adopted by the delegates, upon recommendation of the Reference Committee on Education. This definition, to become effective January 1, 1967, specifies what is included in the 50 hours of acceptable postgraduate study to be termed "Prescribed" and the 100 hours to be obtained from "Elective." A copy of the full statement will appear in a future issue of **GP.**

The Academy's position with respect to Medicare was the subject of heated debate in the reference committee hearings. Delegates approved the following official AAGP policy on the matter of participation in federal government health care programs:

"Having been enacted by the U. S. Congress and signed by the President, a Medicare plan is now law. Hence the Academy should stand ready to confer with government agencies and others to assure that, under the law, our patients will continue to receive the highest possible quality of medical care without any interference with the vital personal relationship between family physicians and their patients.

"The Academy does not have the right to direct its individual members in the position they will take with respect to this new situation. Each member of the Academy must make his own decision as to the degree of his participation in the program. The efforts of the Academy are now being directed, through constructive leadership, toward ensuring adequate and proper representation for the family physician on the councils and advisory agencies created under regulations pursuant to the law."

The foregoing material is but a brief summary of the actions taken at the AAGP meeting.

B. C. MURDY, M.D.
1884—1966

Dr. B. C. Murdy, longtime Aberdeen physician, died November 7, 1966 at St. Luke's Hospital, shortly after being stricken at the Murdy Clinic.

Dr. Murdy was born September 1, 1884 at Moulton, Iowa. He was graduated from the University of Iowa College of Medicine in 1909 and began practice in Aberdeen in June of that year. He had maintained continuous practice in Aberdeen since that time, except for time out for service during World War I.

He was a Fellow of the American College of Surgeons; a member of the Aberdeen District Medical Society, the South Dakota State Medical Association, and the American Medical Association.

Survivors include his widow; two sons, Dr. Carson B. Murdy, Aberdeen, and J. H. Murdy, Fort Collins, Colorado; and one daughter, Mrs. M. E. (Adelaide) Lilley, Garden Grove, California.



SEASON'S GREETINGS

Dear Doctor:

Each Christmas, we of the executive office like to sit back and review the good things that have happened to us during the year.

As always, the best of the "good things" is our relationship with you, our bosses.

So with the Season well in swing let us pause to say "Thank you" and also to wish you the merriest Christmas ever.

For the New Year, we wish you continued success, happiness, and a year of new and gratifying experiences.

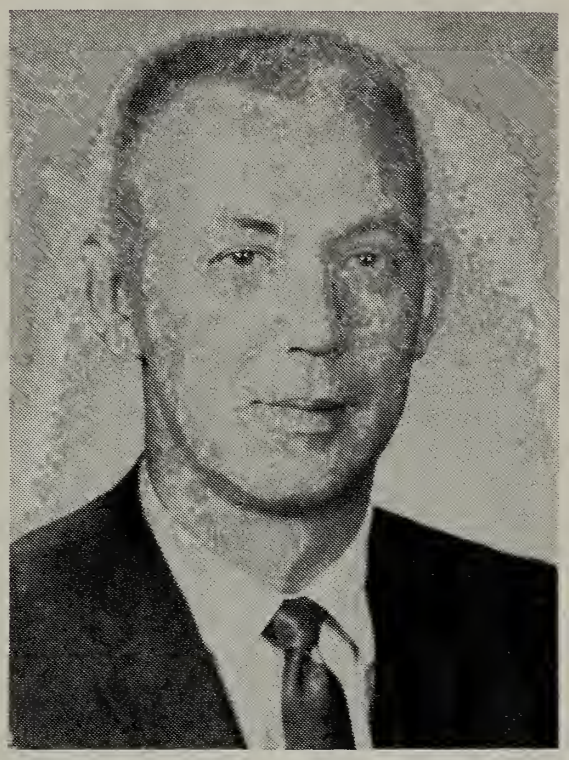
Very sincerely yours,

Your Staff,

South Dakota Medical Association

South Dakota Medical Service, Inc.

PRESIDENT'S PAGE



During the Holiday Season, all of us become aware of the many blessings that we have enjoyed through the year.

I would like to wish each of you a very Merry Christmas, and extend my thanks for the help you have given me through the first half of my presidency.

Preston Brogdon, M.D.
President of the South Dakota State
Medical Association

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News Notes • Changes • Births • News

Pop's Proverb

Often, the things that shock you are the things you never had the courage to try for yourself.



Pictured above is G. R. Bell, M.D., De Smet, with the elk he shot during the annual "controlled Hunt" in Custer State Park.

Dr. Bell had applied four times for this special permit. According to present regulations, an individual is permitted only one permit in a lifetime.

The elk weighed 514 pounds, "hog dressed."

* * *

Tenth Annual Cardiac Symposium sponsored by the Arizona Heart Association, February 10-11, 1967, Del Webb TowneHouse, Phoenix, Arizona. INFO: Arizona Heart Association, 2824 North 16th Street, Phoenix, Arizona 85006.

The American College of Cardiology, Annual Session, Feb. 15-19, 1967, Washington Hilton Hotel, Washington, D. C. INFO: William D. Nelligan, Executive Director, American College of Cardiology, 9650 Rockville Pike, Washington, D. C. 20014.

* * *

A paper on a study of ear disease in children, co-authored by Dr. John B. Gregg, Sioux Falls; Dr. J. P. Steele, Yankton; Dr. H. E. Werthman, Pierre, and Dr. Sylvester Clifford, director of the USD speech and hearing clinic will be published in a professional journal concerned with radiological techniques.

YOUR CONTRIBUTION TO THE SOUTH DAKOTA MEDICAL SCHOOL ENDOWMENT FUND IS NEEDED

Lloyd J. Sweeney, M.D., formerly of Sanborn, Iowa, has joined the offices of Drs. Quinn and Brzica in Sioux Falls. He had spent 20 years as a general practitioner in Sanborn, and will be engaged in general practice in his new association.

* * *

Mrs. Roscoe Dean, Jr., Wessington Springs, president of the Woman's Auxiliary to the South Dakota State Medical Association, attended the conference of the Woman's Auxiliary to the American Medical Association in Chicago in October.

* * *

Three South Dakota physicians were inducted into the American College of Surgeons in San Francisco recently. Those honored so were **Harvard R. Lewis, M.D.** of Mitchell; **Marion R. Cosand, M.D.** of Winner; and **Winston B. Odland, M.D.** of Huron.

* * *

At 21st Annual statewide meeting in Huron of the American Cancer Society, **E. G. Huppler, M.D.,** Watertown was re-elected vice president.

New members of the Board of Directors are **D. L. Ensberg, M.D.,** Sioux Falls, and **Dr. George W. Knabe,** Vermillion, acting dean of the University of South Dakota Medical School.

Carroll L. Witten, M.D., of Louisville, Kentucky, was installed as President of the American Academy of General Practice at their meeting in Boston, Massachusetts.

Dr. Witten, who has served as president-elect for the past year, succeeds Dr. Amos N. Johnson, Garland, North Carolina.

* * *

McGraw-Hill Publishing Company announces the publication of the 32nd book of one of America's most prolific and best loved humorists — Richard Armour. IT ALL STARTED WITH HIPPOCRATES is the fifth in line of the famous "It All Started With" series, and is a study of the history of medicine in Professor Armour's side-splitting and inimitable style.

J. H. Shaeffer, M.D., Sioux Falls, was recently elected to a two-year term on the Board of Control of the Greater Sioux Falls Safety Council.

Dr. Shaeffer was also given a certificate in recognition of his continued cooperation as an instructor in the babysitter training course.

* * *

The South Dakota Nursing Home Association recently held its annual convention in Sioux Falls.

Among the guest speakers was **Preston Brogdon, M.D.,** president of the South Dakota State Medical Association. Dr. Brogdon addressed a noon luncheon.

* * *

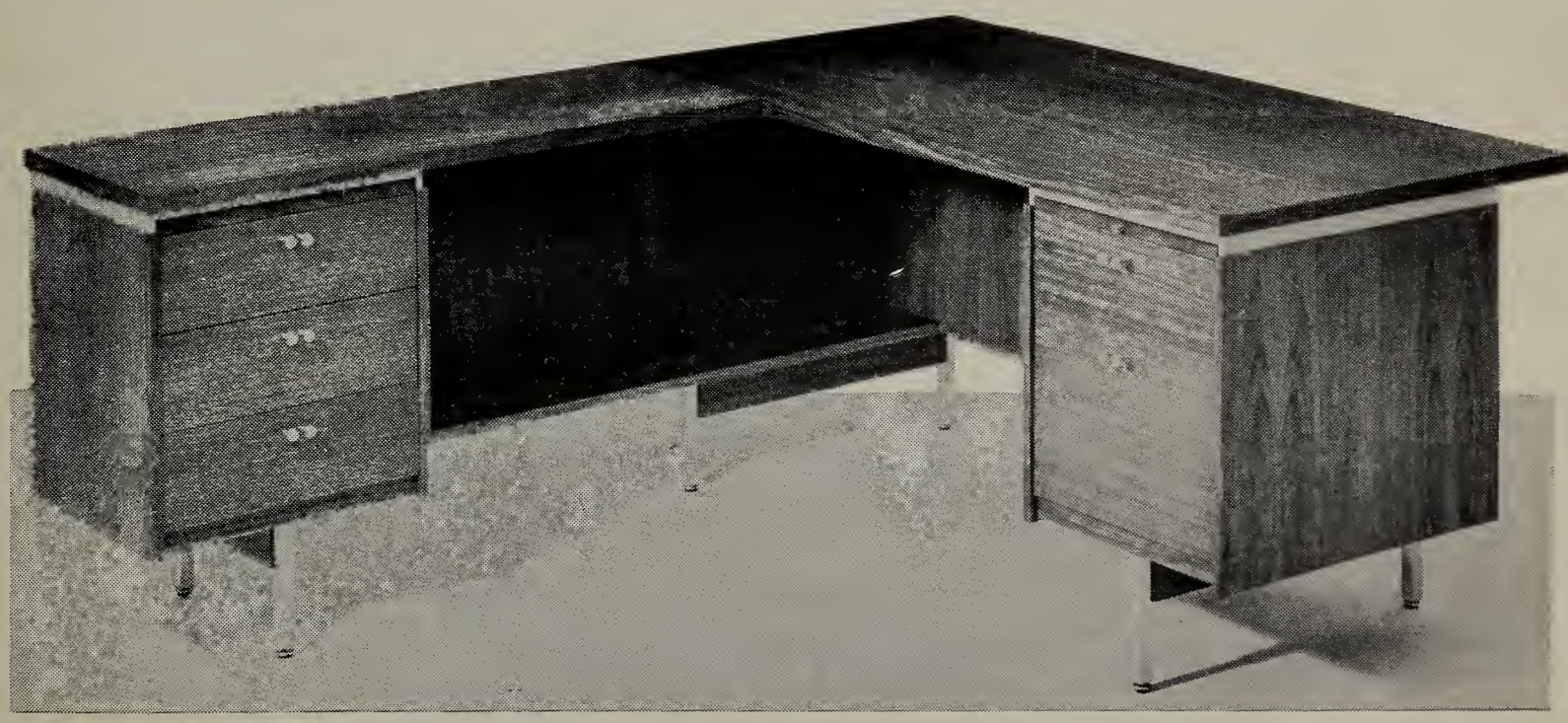
Heading up the activities of Watertown's Community Chest Drive are **G. Robert Bartron, M.D.,** and Mr. Wayne Bredeson.

A second report on a survey of speech and hearing disorders among South Dakota Indian children has been prepared by Dr. Gregg, Dr. Clifford, and Raymond Hulls, formerly of the USD Speech Department. It will be published in the **Eye, Ear, Nose and Throat Monthly.**

* * *

The annual North Central Medical Conference was held in St. Paul, Minnesota on November 12 and 13. South Dakota's delegation included Doctors Preston Brogdon, Art Reding, Paul Hohm, H. Russell Brown, David Gregory, A. J. Tieszen, Edward Johnson, Robert Buchanan, C. L. Vogele, E. T. Lietzke, Karlis Zvejnieks, and A. P. Peeke. Also attending were staff personnel Richard Erickson, Mrs. Patty Butler, and Randall Tuffs.

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INDEX TO VOLUME XIX

BY TITLE, SUBJECT AND AUTHOR

	Month	Page
A		
A Florida M.D. Views Title 19	Dec.	44
A More Vigorous Thearapeutic Approach to Chronic Obstructive Airway Disease David E. Dines, M.D.	April	19
A Stork's Eye View of Medicare	Oct.	31
A Tired American Gets Angry Alan C. McIntosh	May	39
Abortion in Modern Times: Thoughts and Comments H. B. Munson, M.D.	April	23
Allen, Albert R. and Loxi Marian Allen The Appearance of Carcinoma of the Lung in Pulmonary Tuberculosis Patients	July	13
American Academy of General Practice — Report of Annual Session	Dec.	51
American College of Physicians, South Dakota, Program	Sept.	76
Appearance of Carcinoma of the Lung in Pulmonary Tuberculosis Patients, The Albert R. Allen, M.D. and Loxi Marian Allen	July	13
Application of Artificial Cardiac Pacemaking in the Community Hospital, The Warren L. Jones, M.D.; Joseph D. Welty, Ph.D.; and Robert R. Raszkowski, M.D.	Oct.	23
Arneson, Wallace A., M.D. Clinicopathological Conference — Sioux Valley Hospital	Nov.	53
B		
Barlow, John F. Clinicopathological Conference — Sioux Valley Hospital	May	22
	Nov.	53
Congenital Granulocytic Leukemia in a Stillborn Infant	Feb.	34
Barnett, Marilyn, et al Use of Amniocentesis in Hemolytic Disease of the Newborn, The	May	17
Bartron, G. Robert, M.D. and R. J. Weaver, M.D. Cystosarcoma Phyllodes	Jan.	26
Brogdon, P. P. President's Page	July	33
	Aug.	58
	Sept.	77
	Oct.	46
	Nov.	63
	Dec.	53
Brown, John W., M.D. and Philip K. Condit, M.D. Meningococcal Infections, Fort Ord and California	Feb.	15
Budget and Audit Committee Meeting	Aug.	20
C		
Carcinoid Syndrome — PathCAPsule	Jan.	22
Cellular Action of Cardiac Glycosides J. D. Welty, Ph.D.	Sept.	52
Chromosome Analysis and Medical Diagnosis W. H. Hard, Ph.D.	Sept.	22
Clinicopathological Conference — Sioux Valley Hospital	May	22
	Nov.	53
Comments on the Disposition of Vials and Disposable Syringes and Needles	Jan.	31
Committees & Commissions—SDSMA	Aug.	19
Condit, Philip K., M.D. and John W. Brown, M.D. Meningococcal Infections, Fort Ord and California	Feb.	15
Congenital Defects — H. Phil Gross, M.D.	Nov.	51
Congenital Granulocytic Leukemia in a Stillborn Infant John F. Barlow, M.D.	Feb.	34
Copper Metabolism in Wilson's Disease Jerry B. Critz, Ph.D.	Sept.	59
Council Meeting — SDSMA	Aug.	21
	Aug.	23
Critz, Jerry B., Ph.D. Copper Metabolism in Wilson's Disease	Sept.	59
Cutshall, Vincent K., M.D. Clinicopathological Conference — Sioux Valley Hospital	May	22
Cystosarcoma Phyllodes G. Robert Bartron, M.D. and Richard J. Weaver, M.D.	Jan.	26
Cytological Basis of Carcinogenesis Edwin B. Shaw, Jr., Ph.D.	Sept.	46
D		
Deadwood Doctor — Chapter I	May	32
Chapter II	June	33
Chapter III	July	36
Chapter IV	Oct.	44
Chapter V	Nov.	57
Chapter VI	Dec.	47
Dean, Roscoe E., M.D. Human Salmonella Typhimurium	Mar.	20
Deficiency of the Anterior Lobe of the Pituitary In Adult Males Gordon S. Paulson, M.D.	June	22
Delivery and the Defective Child — The Role of Obstetrics C. A. Stern, M.D.	June	27
Diamond, Ben Some Technical Aspects of Salmonella Infection	Mar.	21
Differential Study of Cardiogenic Syncope with the Utilization of Radiotelemetry J. D. Welty, Ph.D., Warren L. Jones, M.D.; and Robert R. Raszkowski, M.A.	Oct.	27
Dines, David E. A More Vigorous Therapeutic Approach to Chronic Obstructive Airway Disease	April	19
Doherty, James E., M.D. and McK. Eugene McNabb, M.D. The Management of Angina Pectoris	Feb.	26
E		
Editorials	Jan.	31
	Mar.	23
	May	39
	June	37
	July	31
	Oct.	47
	Dec.	44
Ensberg, D. L., M.D., et al Megacolon	June	17
Enzyme Studies Useful in Suspected Myocardial Infarction	Mar.	22

	Month	Page
Etteldorf, James N., M.D. Salicylism and Its Treatment by Alkalinization and Intermittent Peritoneal Dialysis	Dec.	39
Experiences With Liver, Thyroid, and Brain Scanning T. A. Ware, M.D.	Dec.	33
F		
Fifty Year Club Members	Aug.	51
Foreword to the Symposium: Cellular Response in Health and Disease Warren L. Jones, M.D.	Sept.	21
Future Supply of Physicians With Special Reference to South Dakota, The George W. Knabe, Jr., M.D.	Jan.	18
G		
Gausch, Charles R., Ph.D. Interferon Production by Virus-Infected Cells	Sept.	30
Genetic Counseling Arthur Robinson, M.D.	Sept.	27
Gout as a Complication of Oral Diuretic Therapy E. W. Sanderson, M.D.	April	13
Gross, H. Phil, M.D. Congenital Defects	Nov.	51
H		
Hard, Walter H., Ph.D. Chromosome Analysis and Medical Diagnosis	Sept.	22
Hohm, Paul, M.D. President's Page	Jan.	23
	Feb.	38
	Mar.	26
	April	33
	May	40
House of Delegates Meetings:	Aug.	23
	Aug.	25
How's Your PRQ, Doctor?	Dec.	46
Human Salmonella Typhimurium Roscoe E. Dean, M.D.	Mar.	20
I		
Idiopathic Pulmonary Hemosiderosis W. R. Taylor, M.D.	Mar.	17
Increasing Menace of Bronchogenic Cancer, The Alton Ochsner, M.D.	Mar.	13
Interferon Production by Virus-Infected Cells Charles R. Gausch, Ph.D.	Sept.	30
J		
Jones, W. L., M.D. Foreword to the Symposium: Cellular Response in Health and Disease	Sept.	21
Jones, W. L., M.D., et al The Application of Artificial Cardiac Pacemaking in the Community Hospital	Oct.	33
Differential Study of Cardiogenic Syncope with the Utilization of Radiotelemetry	Oct.	27
Megacolon	June	17
Jones, W. L., M.D., and W. O. Read, Ph.D. Muscular Dystrophy: Man and Mouse	Nov.	35
K		
Knabe, George W., Jr., M.D. The Future Supply of Physicians With Special Reference to South Dakota	Jan.	18
Knowles, Roy C., M.D., et al Megacolon	June	17
L		
Letters to the Editor	Jan.	31
	Mar.	23
	April	35
	May	37
	July	34
	Oct.	47
	Nov.	58
Ligamentous Injuries About The Knee Ronald L. Linscheid, M.D.	Oct.	23
Linscheid, Ronald L., M.D. Ligamentous Injuries About The Knee	Oct.	23
M		
Management of Angina Pectoris, The McK. Eugene McNabb, M.D. and James E. Doherty, M.D.	Feb.	26
Management of Injuries to the Bone Structure of the Face John L. Terry, M.D.	Dec.	23
Marshall, Finley D., Jr., Ph.D. Phenylketonuria in Relation to Mental Disease	Sept.	49
Maternal Mortality Committee	July	21
Medic Alert Saves Lives	Dec.	45
Megacolon W. L. Jones, M.D.; Guy E. Tam, M.D.; D. L. Ensberg, M.D.; and R. C. Knowles, M.D.	June	17
Meningococcal Infections, Fort Ord and California John W. Brown, M.D. and Philip K. Condit, M.D.	Feb.	15
Minutes — Executive Committee Meeting	Jan.	21
Minutes — House of Delegates	Aug.	23
	Aug.	25
Minutes — S.D.S.M.A. Council Meetings	Aug.	21
	Aug.	23
	Aug.	45
	Nov.	61
Muggly, J. A., M.D. Operative Cholangiography	July	26
Munson, H. B., M.D. Abortion in Modern Times: Thoughts and Comments	April	23
Muscular Dystrophy: Man and Mouse W. O. Read, Ph.D. and W. L. Jones, M.D.	Nov.	35
Mutch, M. G., Jr., M.D.; et al Use of Amniocentesis in Hemolytic Disease of the Newborn, The	May	17
Mc		
McGovern, George (Senator) The Role of Congress and the Physician in Meeting Health Needs	Oct.	39
McIntosh, Alan C. A Tired American Gets Angry	May	39
McNabb, McK. Eugene, M.D., et al The Management of Angina Pectoris	Feb.	26
N		
Neurophysiological Basis of Behavior and Motivation W. O. Read, Ph.D.	Sept.	66
Nordmo, Stanley H., M.D. Phenylketonuria	Jan.	13
O		
Ochsner, Alton, M.D. Increasing Menace of Bronchogenic Cancer, The	Mar.	13
Officers & Councilors — SDSMA	Aug.	19
One Year Later — An M.D. Looks at Medicare	Dec.	45
Operative Cholangiography J. A. Muggly, M.D.	July	26

	Month	Page
P		
PathCAPsule	Jan.	22
	Feb.	33
	Mar.	22
	April	31
	May	30
	Nov.	59
	Dec.	41
Paulson, Gordon S., M.D. Deficiency of the Anterior Lobe of the Pituitary in Adult Males	June	22
Phenylketonuria Stanley H. Nordmo, M.D.	Jan.	13
Phenylketonuria in Relation to Mental Disease Finley D. Marshall, Jr., Ph.D.	Sept.	49
Pitt-Hart, Barry T., et al Use of Amniocentesis in Hemolytic Disease of the Newborn, The	May	17
Possible Role of Bacterial L-Forms in Disease, The Paul F. Smith, Ph.D.	Sept.	40
Preceptor Program for 1966	June	40
President's Page	Jan.	23
	Feb.	38
	Mar.	26
	April	33
	May	40
	July	33
	Aug.	58
	Sept.	77
	Oct.	46
	Nov.	63
	Dec.	53
R		
Raszkowski, Robert R., M.A., et al Differential Study of Cardiogenic Syncope with the Utilization of Radiotelemetry	Oct.	27
The Application of Artificial Cardiac Pacemaking in the Community Hospital	Oct.	33
Read, W. O., Ph.D. Neurophysiological Basis of Behavior and Motivation	Sept.	66
Read, W. O., Ph.D. and W. L. Jones, M.D. Muscular Dystrophy: Man and Mouse	Nov.	35
Reports of Committees as Adopted by the House of Delegates	Aug.	37
Reports of Councilors and Officers as Adopted by the House of Delegates	Aug.	26
Robinson, Arthur, M.D. Genetic Counseling	Sept.	27
Role of Congress and the Physician in Meeting Health Needs, The George McGovern, Senator	Oct.	39
Ross, Ronald S. D. Doctor Heads Viet Nam Surgical Team	Oct.	42
Roster — By Alphabet, 1966	Aug.	55
Roster — by Districts, 1966	Aug.	52
S		
Salicylism and Its Treatment by Alkalinization and Intermittent Peritoneal Dialysis James N. Etteldorf, M.D.	Dec.	39
Sanderson, E. W., M.D. Gout as a Complication of Oral Diuretic Therapy	April	13
S. D. Doctor Heads Viet Nam Surgical Team Ronald Ross	Oct.	42
Serum Protein Bound Iodine as a Measure of Thyroid Function	April	31
Shaw, Edwin B., Jr., Ph.D. Cytological Basis of Carcinogenesis	Sept.	46
Smith, L. C., Ph.D. Some Disorders of Amino Acid Metabolism in Man	Sept.	56
Smith, Paul F., Ph.D. The Possible Role of Bacterial L-Forms in Disease	Sept.	40
Some Disorders of Amino Acid Metabolism in Man L. C. Smith, Ph.D.	Sept.	56
Some Technical Aspects of Salmonella Infection Ben Diamond	Mar.	21
South Dakota Poison Information Center, The R. P. Spoor, Ph.D. and J. N. Spencer, Ph.D.	Nov.	31
Spencer, J. N., Ph.D. and R. P. Spoor, Ph.D. The South Dakota Poison Information Center	Nov.	31
Spoor, R. P., Ph.D. and J. N. Spencer, Ph.D. The South Dakota Poison Information Center	Nov.	31
SYMPOSIUM: Cellular Response in Health and Disease	Sept.	21
T		
Tam, Guy E., M.D., et al Megacolon	June	17
Taylor, W. R., M.D. Idiopathic Pulmonary Hemosiderosis	Mar.	17
Terry, John L., M.D. Management of Injuries to the Bone Structure of the Face	Dec.	23
This Is Your Medical Association	Jan.	33
	Feb.	39
	Mar.	27
	April	34
	May	41
	June	39
	July	40
	Aug.	59
	Sept.	79
	Oct.	48
	Nov.	64
	Dec.	54
Trends in Maternal Mortality in South Dakota: The Past Decade	July	21
Triiodothyronine (T-3) Uptake, A Method of Thyroid Function	May	30
U		
Urine Bacteriology	Feb.	33
Use of Amniocentesis in Hemolytic Disease of the Newborn M. G. Mutch, Jr., M.D.; Barry T. Pitt-Hart, M.B., Ch.B.; Marilyn Barnett, B.A., M.S., M.T.	May	17
W		
Ware, T. A., M.D. Experiences With Liver, Thyroid and Brain Scanning	Dec.	33
Weaver, Richard J. and G. Robert Bartron, M.D. Cystosarcoma Phyllodes	Jan.	26
Welty, J. D., Ph.D. Cellular Action of Cardiac Glycosides	Sept.	52
Welty, J. D., et al Differential Study of Cardiogenic Syncope With The Utilization of Radiotelemetry	Oct.	27
The Application of Artificial Cardiac Pacemaking in the Community Hospital	Oct.	33
Whose Blues?	June	37



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